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Volume 19 September 1950 Number 9

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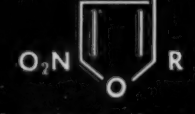

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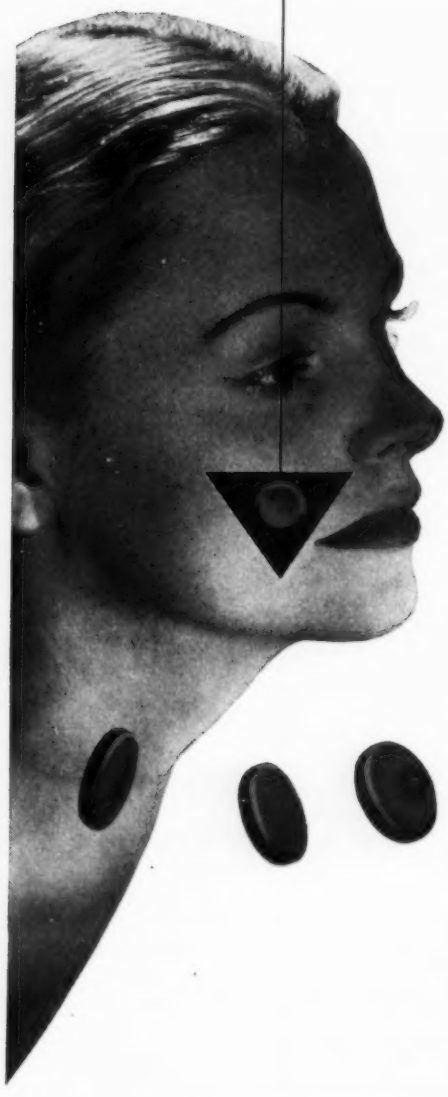

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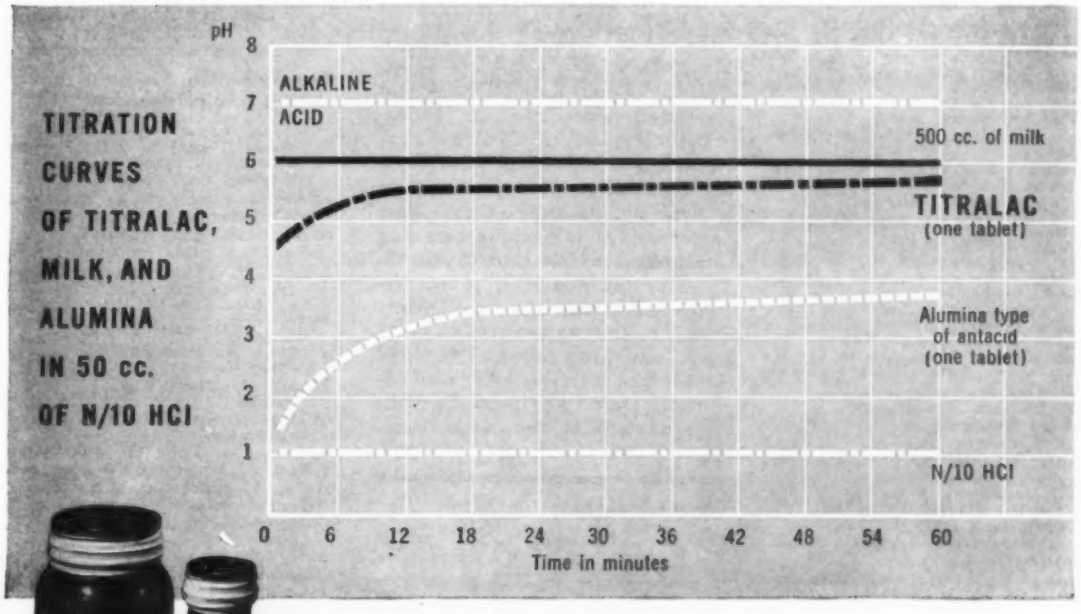

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1. Rossett, N. E., and Flexner, J.: Ann. Int. Med. 18: 193 (1944). 2. Freezer, C. R. E.; Gibson, C. S., and Matthews, E.: Guy's Hosp. Reports 78: 191 (1928). 3. Aaron, A. H.; Lipp, W. F., and Milch, E.: J. A. M. A. 139: 514 (Feb. 19) 1949. 4. Kirsner, J. B., and Palmer, W. L.: Illinois M. J. 94: 357 (Dec.) 1948. 5. Kimball, S.: in Practice of Medicine (Tice). Hagerstown, Md., W. F. Prior Company, Inc., 1948; p. 210. 6. Special Article: M. Times 76: 10 (Jan.) 1948.

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ASSOCIATION NEWS

Industrial Health Conferences

THE 1951 Industrial Health Conference, of the five participating Associations—Industrial Physicians and Surgeons, Industrial Hygienists, Industrial Nurses, and Industrial Dentists—will be held, as we hope everyone knows, at Atlantic City, New Jersey, with headquarters at Chalfonte-Haddon Hall, April 23-28. The place and time of the 1952 Industrial Health Conference of the same Associations have now been fixed. The 1952 Conference will be held at Cincinnati, Ohio, April 19-26, with headquarters at the Netherland-Plaza Hotel.

Recent Deaths

LOYAL A. SHOUDY, M.D., Chief of Medical Service, Bethlehem Steel Company, died at St. Luke's Hospital, Bethlehem, Pennsylvania, on the morning of August 30, 1950, after a long illness.

ARTHUR LEO WEBER, M.D., F.A.C.S., at Upland, California, March 8, 1950. DR. WEBER was born in Summerfield, Illinois, April 14, 1883; received his M.D. at Northwestern University Medical School, June 1910; was industrial surgeon for local citrus packing houses, Pacific Electric Railway and many employees' liability insurance companies in the area. He was a member of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIAN'S AND SURGEONS, and a Fellow, A.A.I.P. & S., since 1939.

JOHN FRANCIS KENNEY, M.D., 60, at Pawtucket, Rhode Island, on March 20, 1950. DR. KENNEY was a Fellow and Honorary member, A.A.I.P. & S., and Past President, NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS AND SURGEONS. He received his M.D. at Tufts College Medical School, Boston, 1913; and was an outstanding industrial internist in Rhode Island.

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IRVING R. TABERSHAW, M.D., Director of Eastern Medical Division, Liberty Mutual Insurance Company, and Associate Professor of Industrial Hygiene, Columbia University, is presently in Germany on a Special Assign-

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ment for the State Department. He is making a survey of current industrial medical problems with a view toward assisting the Western German nation to develop a modern industrial hygiene program.

LEONARD J. GOLDWATER, M.D., Professor of Industrial Hygiene at the School of Public Health, Columbia University, has been awarded a World Health Organization Fellowship for the study of Occupational Medicine in several European countries. DR. GOLDWATER plans to go abroad early in October, for about two months, dividing the time between England, France, Switzerland and the Netherlands.

LEWIS B. CASE retired on August 1 from the Industrial Hygiene Department of General Motors Research Laboratories. MR. CASE started in the GM Chemical Laboratory on Piquette in 1911, moved with it to the Boyer-Campbell Building at Brush and Congress in 1912, and seven years later moved his desk to the new GM laboratory on E. Grand Blvd. In 1925, that laboratory was combined with the GM Research Corporation which C. F. (Boss) Kettering had founded at Dayton, Ohio. MR. CASE became a specialist in industrial hygiene in various GM plants in 1936. He has the third longest employment record in GM research laboratories, exceeded only by Kettering, now a consultant after 41 years' service, and Fred W. Klein, of the Processing Department, who has a 40-year record.

—*Detroit Free Press*, August 1, 1950.

EDWARD C. HOLMBLAD, M.D., Managing Director of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, and OSCAR A. SANDER, M.D., Associate in Medicine, Marquette University, and Consultant in Occupational Disease, will be among the lecturers at the Fifth Annual Post-graduate Course in Diseases of the Chest, sponsored by the Council on Post-graduate Medical Education and the Illinois State Chapter of the American College of Chest Physicians, to be held at the St. Clair Hotel in Chicago, October 16-20, 1950. DR. SANDER'S presentation on "Dust Diseases" will be given at 9 A.M., October 17. DR. HOLMBLAD will speak on "Control of Respiratory Infection in Industry" at 11 A.M. the same day.

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References: 1. Management of the Common Cold with Neohetramine. Ind. Med. & Surg. 19:39-41 (Jan.) 1950. 2. Cost of the Common Cold: Met. Life Ins. Co. Stat. Bull. 28:6 (Nov.) 1947.

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WILLARD MACHLE, M.D., Chairman, FRANCIS HEYROTH, M.D., GEORGE H. GEHRMANN, M.D., HERMAN LISCO, M.D., and NORTON NELSON, M.D., comprise the new Panel on Environmental Cancer, formed by the Committee on Growth of the National Research Council, adviser for research to the American Cancer Society. Realization of the importance of further research in environmental cancer led to the creation of this panel which, at the outset, will concern itself with an evaluation of the status of knowledge in this field and with the formulation of criteria for the establishment of valid relationships between environment and occupation and the occurrence of cancer. It also will review applications for grants in support of research in these areas. These applications, as with others submitted to the Committee on Growth, will be received until October 1. Communications regarding grants may be addressed to the Executive Secretary, Committee on Growth, National Research Council, 2101 Constitution Avenue, N. W., Washington 25, D.C.

EXPECTATION of life at birth among American wage earners and their families increased in 1949 to a new high of 67.7 years. This is based upon the experience among the millions of industrial policyholders of the Metropolitan Life Insurance Company. The 1949 figure represents a gain of a half year over that for 1948, and of fully five years over the 1939 figure. In 1911-1912 the expectation of life at birth among the industrial policyholders was 6½ years below that for the general population; at present, both are on a par.

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American Conference of Governmental Industrial Hygienists, U. S. Public Health Service, Washington, D. C. J. J. BLOOMFIELD, Secy-Treas. April 22-24, 1951, Atlantic City

American Industrial Hygiene Association 4400 Fifth Ave., Pittsburgh 13, Pa. HENRY F. SMYTH, JR., Executive Secy. April 23-26, 1951, Atlantic City.

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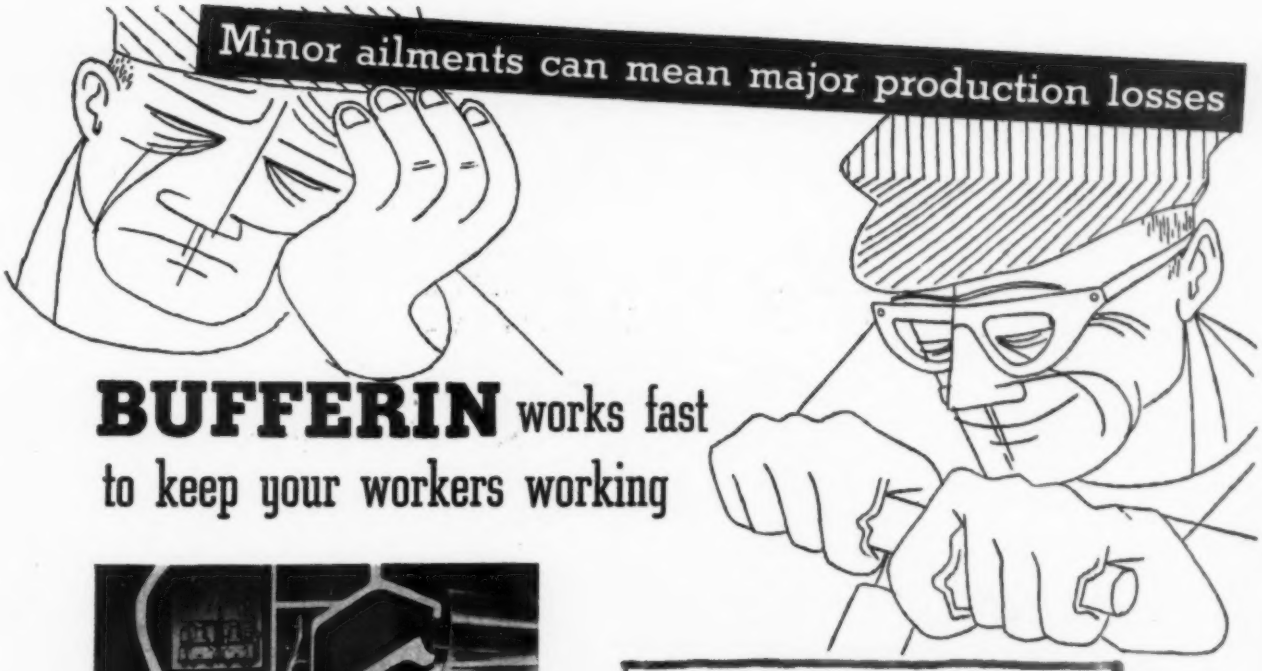

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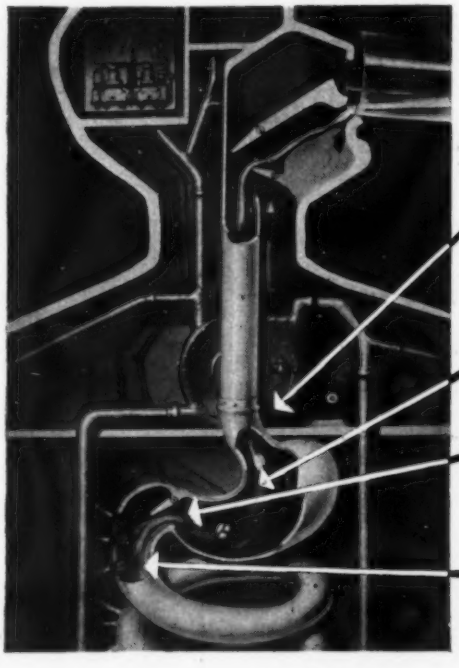

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1. Effect of Buffering Agents on Absorption of Acetylsalicylic Acid. J. Am. Pharm. A., Sc. Ed. 39:21, Jan. 1950.

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[1]Cooke, R. A.: *Allergy in Theory and Practice.* Philadelphia: W. B. Saunders Company, 1947, p. 186

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Bibliography: 1. Mayer, L. L.: Arch. Ophth. *39*:232, 1948. 2. Kuhn, H. S.: Tr. Am. Acad. Ophth. (May-June) 1946, p. 210. 3. Wilkinson, O., in discussion of Mayer, L. L.: Arch. Ophth. *39*:232, 1948.

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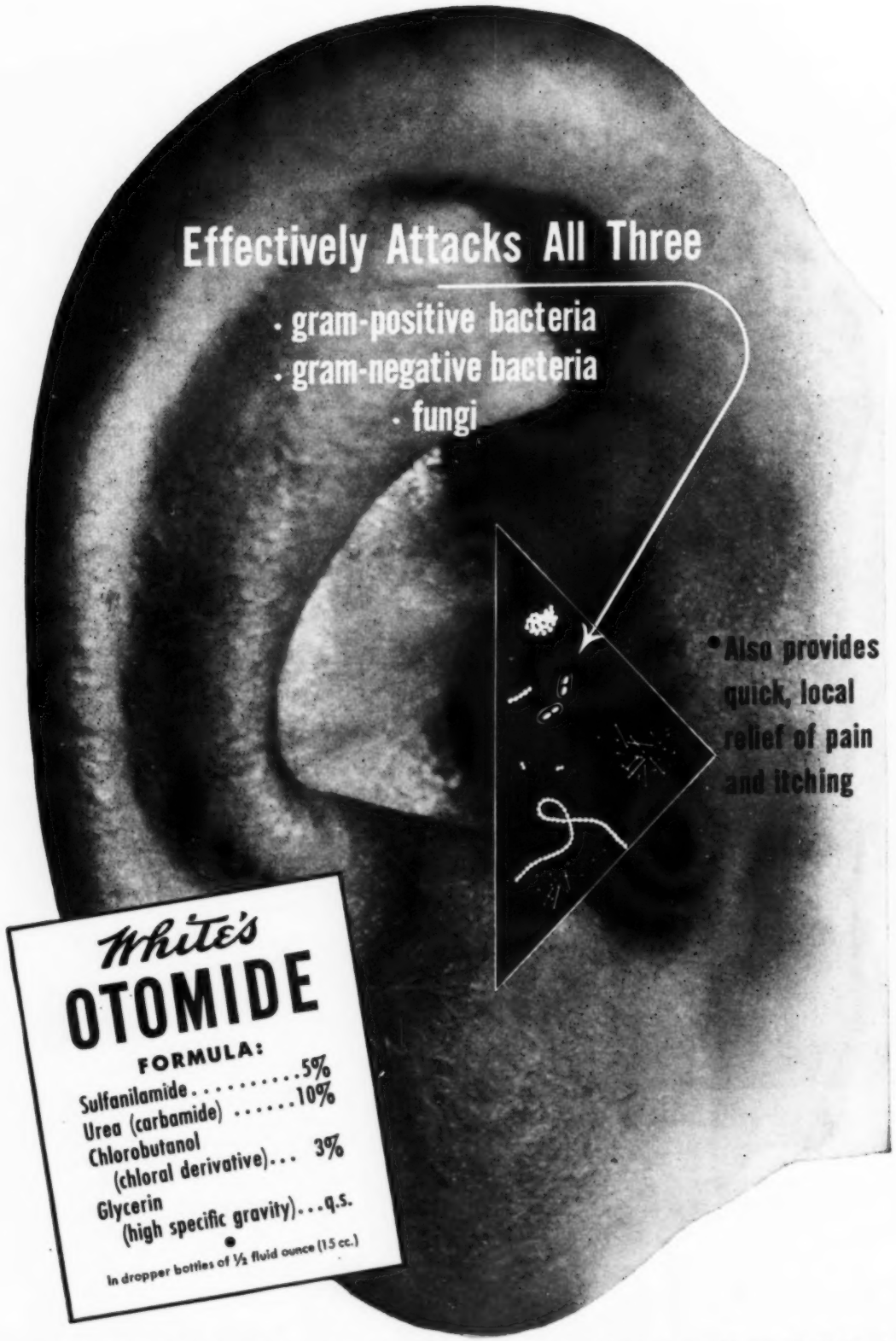

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Bowers, Warner F., Amer. J. Surgery, LXXIII; 37 (1947)

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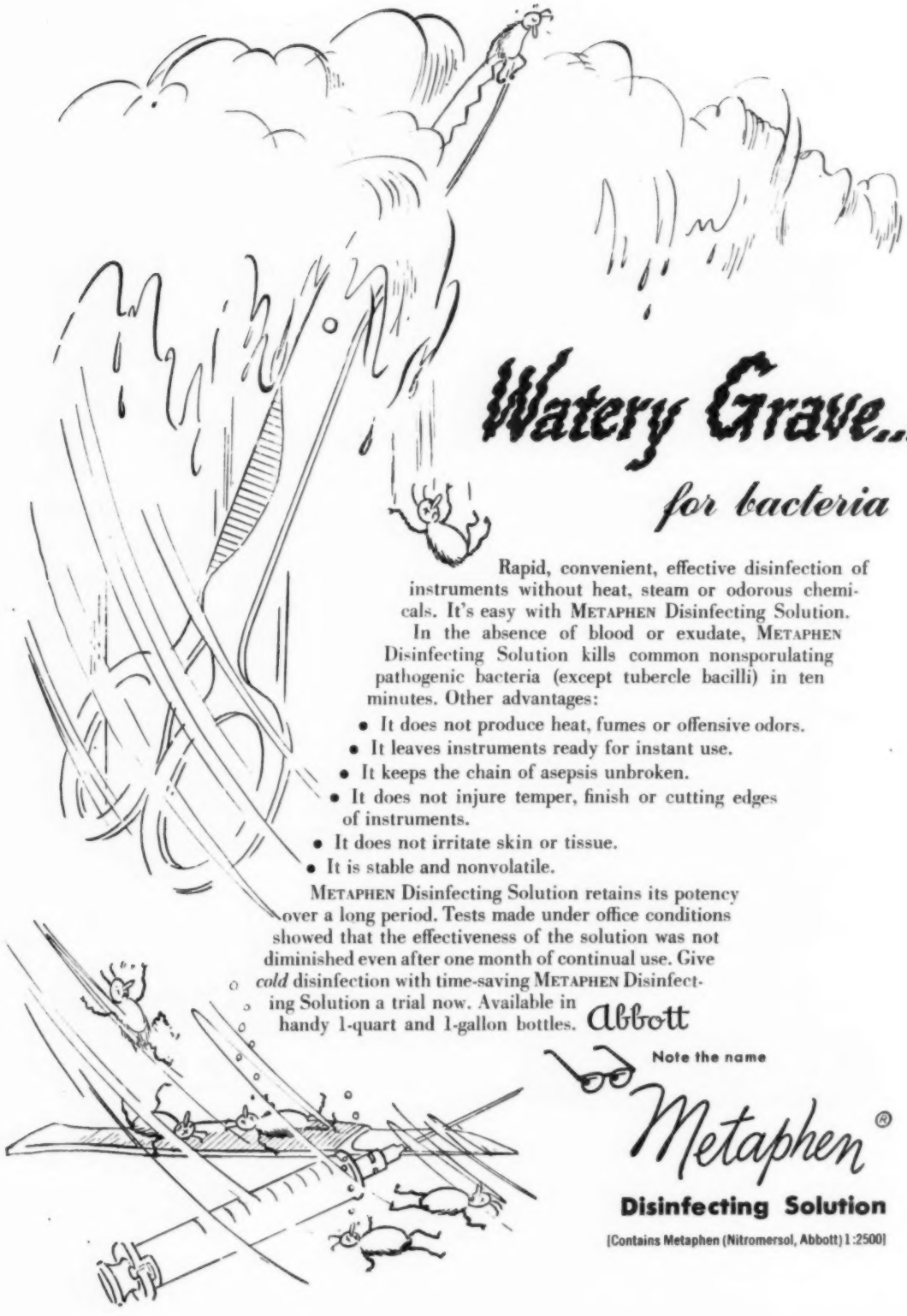

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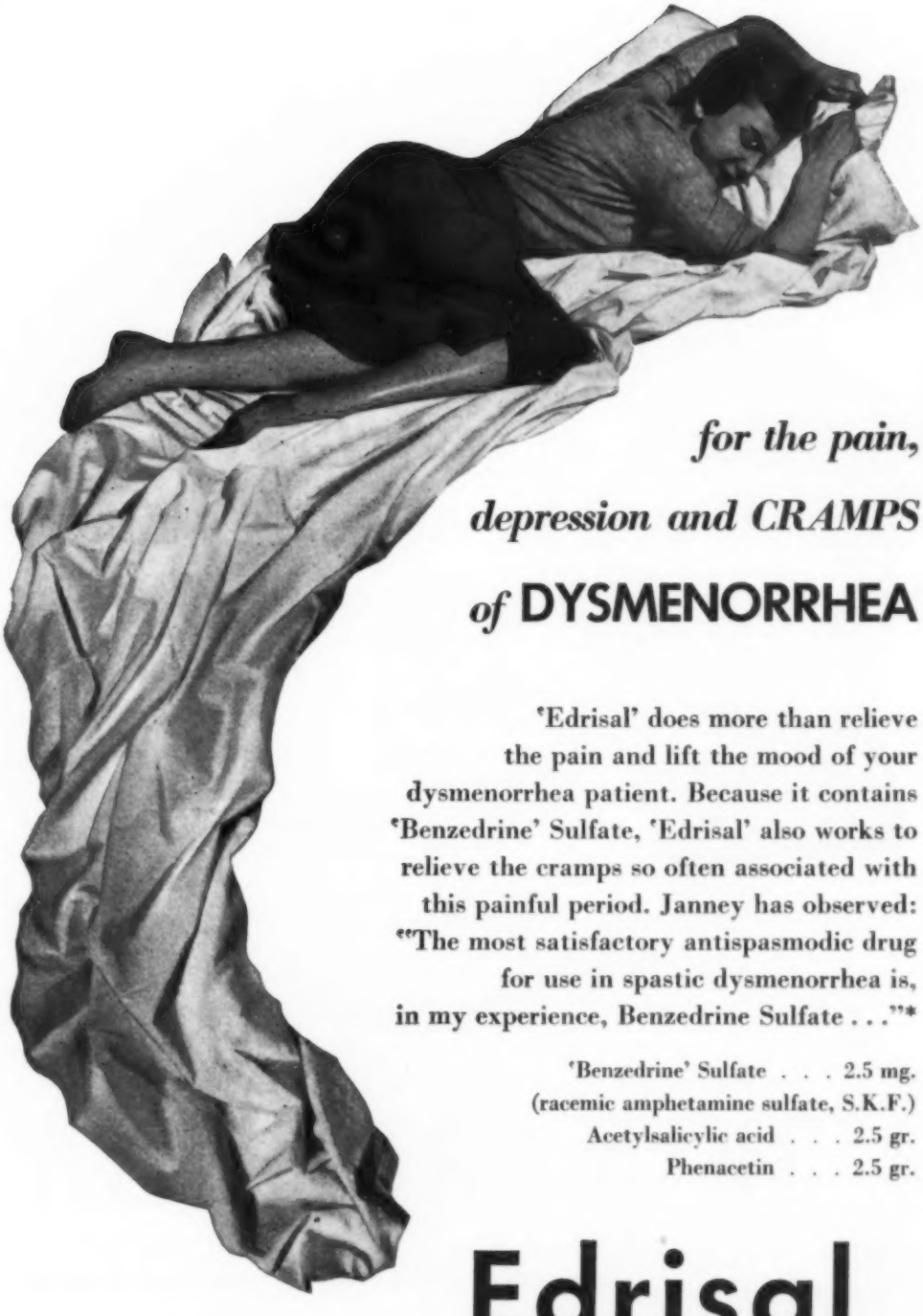

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Volume 19 SEPTEMBER 1950 *Number 9*

GENERAL MOTORS MEDICAL CONFERENCE

La Grange, Illinois,

April 24, 1950

The Experience of General Motors in Developing New Techniques for Selection, Placement and Follow-Up of Employees

—A Panel Discussion—

GEORGE A. JACOBY,
Moderator,
Director of Personnel Services,
General Motors Corporation

WHY has General Motors been increasing emphasis upon the selection, placement, and follow-up of employees? One answer might be that we hire a great number of people. Most of you are familiar with the City of Albany. According to the last census Albany had a population of approximately 130,000. In General Motors in the year 1949, we *hired* just about that number of people. We hired 116,926 on our hourly roll, and 13,031 on our salaried roll—a total of 129,957 *new* employees. That was the total necessary to take care of the increase which we made last year in our total employment, and to replace employees who quit or were separated for other reasons.

Where one is engaged in an activity involving that number of people it is important to do a good job, but that is what might be called the *quantitative* approach. The second important reason for emphasizing this function has to do with the *quality* of the people we employ, or, as Mr. Wilson has said, "Making sure they are physically, mentally, and temperamentally fitted to the jobs they are expected to do." It is the *quality* of people we hire today that will determine what kind of company we will have five, 10, 20 and 30 years from now.

MAY one say a word about General Motors? Some people, not familiar with the Corporation, picture General Motors as one large organization employing over 400,000 people, all concentrated in a few big plants around Detroit. Actually, as you know, General Motors is decentralized.

We now have about 98 manufacturing plants, located in some 46 cities in 16 states. Our largest plant has about 20,000 employees. In fact, we have only a few plants in the range of 5,000 to 15,000 persons. The greatest number of plants have from 1,000 to 5,000 employees, while many of them have fewer than 1,000. In other words, our problems in the area of employment are not essentially different from those experienced by other industrial companies, irrespective of the size of a particular company. We do not hire 130,000 all in one place, for there is no such centralization in employment. People are hired in employment departments in each of our 98 plants, and the number hired in 1949 in any one plant ranged from fewer than 100 to more than 8,000.

WHEN we speak of our experience in new techniques in this general field, we do not wish to give the impression that we have failed to recognize the importance of selection and placement in earlier years. What we are doing today simply is building on the foundation of much of the good work which has been undertaken in the past.

Furthermore, we do not wish to create the impression that the steps which will be described to you are necessarily final. Some of these developments must still meet the test of further use.

The original panel on this subject, including the papers on pages 399 to 412, herein, was presented at the 10th Annual Congress on Industrial Health, Conference on Human Relations in Business and Industry, held in New York City by the American Medical Association, February 21, 1950. A modified form of the original panel was given at the General Motors Medical Conference. That is the version published here.

General Motors Medical Conference

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Selective Placement in Industry

MAX R. BURNELL, M.D.,
General Motors Corporation,
Detroit, Michigan

IT WOULD be well, at the outset, to define selective placement, particularly in its relation to the experience which has resulted from the development of new techniques in selection, placement, and follow-up among large numbers of those industrially employed. Selective placement does not mean vocational rehabilitation. Rehabilitation has been defined as the return of a person, disabled by accident or disease, to his greatest physical, mental, emotional, social, vocational, and economic usefulness. Our present conception of selective placement has been broadened to include those without *apparent* physical handicaps, not just limiting the program to the obvious problems associated with the employment of those with *definite* physical disabilities. True, many of the present techniques to be discussed were outgrowths of an attempt to place the physically handicapped in a position in industry where they could no longer be considered handicapped.

This experience taught us that greater emphasis should be placed on the abilities of the individual rather than on his disabilities—a positive rather than a negative approach.

The first step in developing such a program necessitated a more intelligent matching of the demands of the job with the physical capacities of the employee. Real selective placement must go beyond an accurate determination of the individual's *physical* abilities and an analysis of the *physical* demands of the job. Knowledge of an employee's skills, abilities, interests and attitudes is a basic factor in selective placement. This concept received its greatest test in General Motors following World War II when over 100,000 men and women who had served in the Armed Forces were successfully returned to productive employment.

THE industrial physician's part in this program is to appraise the specific capacities of the individual from the knowledge gained from the medical history and the physical findings of his examination. The information resulting from such an appraisal cannot be translated into capacity for work by mathematical formulas. The two most important factors in estimating such capacities are: (1) the skill and diagnostic insight of the examining physician, and (2) his personal knowledge of the industrial environment in which the employee is to be placed.

With the improvement in interviewing techniques, employee testing, performance rating, and employee attitude evaluation programs the industrial physician finds himself but one member of a team. His is a definite responsibility, for he must indicate *what* the employee can do, *how* much, and for *how* long. Physical analysis employee record forms have been developed to record such information. On the "Physical Analysis Record" there is no need for the use of diagnostic terms or any discussion of the illness or disability behind specific restrictions. Rather, the degree of capacity is shown by objectively recorded data, and in this manner the confidential doctor-patient relationship is preserved. This information is in such form that it can be compared item by item with the same information on the "Physical Demands Analysis" of the job.

In analyzing specific jobs or related job families the "Physical Demands Analysis" sheet should record such information as, for example: Is the height or weight of the employee a factor? Is standing or walking necessary—and if so, for what percentage of the work day? What movements of the feet or legs, or what coordination between them is necessary? What are the requirements for weight lifting—above or below the waist—how many pounds, and how frequently? Is stooping, twisting or climbing necessary? What are the sight requirements—is color blindness disqualifying—can an employee partially blind or totally blind do this job? Is "normal" hearing needed, or is impaired hearing to the point of deafness acceptable? What about the temperature and atmospheric conditions—are there sudden heat changes, and are dusts, fumes, and vapors present? Specifically, what are the job hazards, and what protection will be needed?

Thus, there is presented a basic pattern and a common terminology for the industrial physician, the job analyst, and others concerned with selective placement.

MANY types of physical demands and physical analysis forms are in use today. No standardized system has yet been developed. As DR. C. D. SELBY has stated, "It is true that much is to be gained from the study of existing plans, but we should not stop here. How is the industrial physician to expand his knowledge and ability to analyze the physical capacities of workers? How is the job analyst to refine his methods? How is the personnel officer to collect data on the physical and skill characteristics of workers and jobs? How are the industrial engineers and safety engineers to participate by reducing the physical demands and hazards of jobs? How are these techniques to be developed to allow proper on-the-job evaluation, supervision, up-grading and follow-up?" The answer to these questions can

be resolved successfully only by continued cooperation on the part of the industrial physician, the trained interviewer, the educational director, the job analyst, the industrial engineer, and the supervisor.

Selective placement programs must be on a continuing basis. Proper job adjustments and selective transfers are as much a part of the program as the original selective placement.

The industrial physician analyzes the results of his physical appraisal in a different light from formerly. An evaluation of the capacities of an individual is a challenging thing. It arouses an interest that goes far beyond noting the anthropological differences in mankind—the individual deviations from what is considered "normal." He becomes an enthusiastic member of that team. He realizes that proper placement in a job suited to a worker's abilities leads to a reduction in fatigue, lower accident rate, reduced labor turnover, and improved employee satisfaction and morale.

This is just as much a part of his over-all health maintenance program as the supervision of the working environment of employees with arrested tuberculosis, diabetes, and arthritis. In fact, there are few instances where the broad program of selective placement does not play a part in the activities of the modern industrial medical department.

One phase of selective placement does not lend itself to a charted analysis. When selective placement problems involve a personality inventory or consideration of the mentally retarded, the neurotic, or the emotionally unstable, the relationship of the industrial physician, the psychiatrist, the psychologist or the counselor with the employee must be on a more intimate and personal plane. It has been stated that the industrial medical department is one of the major focal points within industry from which the spirit of constructive human relations constantly radiates. Here we must pay tribute to the sympathetic understanding of the industrial nurse, who is frequently the one who first recognizes disturbed emotional states.

CAREFULLY recorded visits to industrial medical departments have shown that 80 to 85% of such visits are limited to about 30% of the working force. The majority of complaints from this minority group are based on emotional, neurotic, psychosomatic, or psychiatric problems. The experienced industrial physician recognizes the importance of allaying fears and anxiety states. He recognizes when adjustments in jobs or working environment are necessary. Here again the physician is but one member of the team. For example, emotional upsets frequently arise from the employee's being asked to perform tasks which require a higher degree of skill than he possesses. Testing programs are of great value in minimizing such instances. On-the-job evaluation by supervisors skilled in handling the problems of the emotionally unstable brings the realization that it is the human relations aspect rather than skill or ability which often determines success or failure.

A selective placement program is not confined to the economic phase of job placement. It is aimed at maintaining the dignity of the human being, and at expanding his capacity for living by enabling him to make the best use of his physical and mental abilities.

"Does It Pay Off in Dollars and Cents?"

IS THERE any way of determining whether increased emphasis on the subjects of selection and placement really brings results? Does it pay off in dollars and cents? About two years ago we began issuing a quarterly "Quit Report." For years we had maintained a record of our turnover rates, and these had been available to our plants. However, the plants were ranked alphabetically. In this Quit Report we began ranking them in order of turnover rates—the lowest rate having the top position. We also dramatized turnover by converting it to a dollar cost. After some studies we felt safe in assuming that whenever an employee quit there was a cost of at least $100 in hiring and training a replacement. That's an average, and we admit it is somewhat arbitrary. But in the Quit Report we have taken the actual quits, multiplied them by $100, and extended the total. Examination of our Quit Reports shows that in each month of 1949 the monthly cost of quits was lower than in the similar month of 1948. We recognize that this method of comparison may be subject to qualifications, but one thing is unquestionably true—we had 24,213 fewer quits during 1949 than we had in the previous year, and this certainly represented a substantial saving in cost.

—GEORGE A. JACOBY, Director of Personnel Services, General Motors Corporation.

Interviewing Techniques

A. A. HENDRIX,
Director of Employment Practices,
General Motors Corporation,
Detroit, Michigan

SOME members of management long have recognized the possibilities for scientific improvement in the selection and placement of employees. As an example, in 1945, Mr. C. E. Wilson, President of General Motors, set up as Corporation policy six Basic General Motors Principles. No. 1 of these principles is:

"Put the right people in the right places.

"The careful selection and placement of employees to make sure that they are physically, mentally and temperamentally fitted to the jobs they are expected to do; to make sure that new employees can be reasonably expected to develop into desirable employees, and so that there will be a minimum number of square pegs in round holes."

In addition to Mr. Wilson, many of our management personnel in the plants, divisions and the central office long have recognized the importance of improving all of the employment functions, including the interview, and they have been working toward this end.

To supplement the employment work being done in the plants, General Motors added an employment function as an additional staff activity on May 1, 1948. The responsibility of this new employment function is to work with the plants and divisions in the improvement or development of employee selection and placement techniques and tools. As the first step in starting this new activity, we began interviewing personnel directors, employment people and interested central office executives to determine what areas should be given first consideration.

We found through those interviews that almost all agreed that our first efforts should be devoted toward the development of improved interviewing techniques. In line with this thinking, an Employment Committee, composed of 20 personnel directors and five interested central office excutives, was called together to determine the approach we should take in improving these techniques. This Committee appointed a Development Team and delegated to it the responsibility of designing, developing and writing complete Basic Reference Material covering all types of employment interviewing. The Development Team which prepared this Basic Reference Material on interviewing was made up of four men, Mr. M. S. Firth, Dr. Orlo Crissey, Dr. R. K. Burns, of the University of Chicago, and Dr. C. E. Evans, of the General Motors Employee Relations staff. Mr. Firth and Dr. Crissey are members of the General Motors Institute which, as you know, is an industrial training institution established by General Motors some 30 years ago.

Perhaps the most concrete evidence that real progress is being made in the field of scientific selection and placement of employees lies in the fact that on May 12 of this year more than 90% of all the General Motors employment people, whose major responsibility is selecting and placing employees, have completed a two-week intensive training program in interviewing techniques. This means that the managers of 106 General Motors plants throughout the United States and Canada and their personnel directors have seen fit to take their interviewers and employment managers off their day-to-day jobs and send them to Flint, Michigan, for two periods of one week each. If you will consider these two facts: (1) that General Motors is run on a strictly decentralized basis, and (2) that each plant manager and personnel director is wholely responsible for his individual budget and expenses, then we believe you will agree that these members of management recognize that interviewing is not a routine clerical operation, but it is a scientific process.

The enthusiasm of all the trainees in this training program has been high throughout the sessions. Perhaps to some extent this is due to some new techniques used in our training methods. For example, a lot of role-playing is used and all the interviews are recorded on a tape recorder which allows easy playback, stop, replay, etc. All the interviewing material is taken from actual case histories.

THIS Interviewing Training Program consists of one week's work at the General Motors Institute in Flint, Michigan, where the trainees, in groups of 20, are given the new interviewing techniques. At the end of this first week's work, they return to their respective jobs for a six-week period where the new techniques are put into operation and tried out. The trainees then return to the Institute for an additional week of clinical-type training and analysis of the effectiveness of the new techniques. This second week also includes skill development work on the specific needs of each member of the group.

The training program uses the Basic Reference Material as the text, and is built around actual case material brought in from the plants by the interviewers. The Basic Reference Material is made up of 17 sections covering all phases of the interview. There is not time to give you the highlights of these 17 sections, but we will be glad to answer any questions regarding this

Reference Material. To give you some idea of its content, we will review several of the highlights of Section VI, "Basic Factors the Interviewer Looks For." We believe that the five key factors the interviewer should look for in evaluating an applicant or an employee with respect to his suitability for a given job or jobs are:

1. Health and physical status.
2. Abilities and knowledge.
3. Interest and motivation.
4. Personal adjustment.
5. Special influencing conditions.

TO ILLUSTRATE the analytic approach of matching men and jobs, an interviewing aid using these five major factors was developed. The primary purpose of the interviewing aid is to show as a training method the important and logical sequence of planning, summarizing and evaluating an interview.

This interviewing aid breaks down as follows:

1. *Job requirements in terms of each factor.* This section is intended to help the interviewer think through the specific requirements of the particular job or jobs in question.

2. *Available information about the individual in terms of each factor.* This covers generally that information which is available before the interview, such as the application blank, reference checks, investigation of applicant's past record, etc.

3. *Additional information to be obtained from the interview in terms of each factor.* This section is designed to encourage the interviewer to decide before he starts the interview what he needs to get from the interview and to make some definite plans on how he intends to obtain this information.

4. *Summary of information and observations obtained from the interview in terms of each factor.* This is a summarization of just what the interviewer learned from the interview and his observations of the person interviewed.

5. *Evaluation of the individual in terms of each factor.* This section is all-important since it is intended to help the interviewer evaluate all the facts that have been obtained up to this step, and to help him make a mature judgment in the light of all of this information as to whether the interviewee fits the requirements of the job in question.

When he knows what the job requires in each of the five factors earlier stated, he then reviews the available data about the individual under consideration in terms of the job requirements in each of these five factors. Since he has reviewed the available data, the additional information needed becomes obvious, and he then makes his plans to obtain that information. Next he summarizes all the facts and his observations obtained from the interview. Through the evaluation of all the information that is pertinent to the requirements of the job and the applicant or employee under consideration, he is in a position to exercise mature judgment.

We recognize that the interview, like any of the employment tools, can be ineffective if improperly used. On the other hand, we are sure that through this type of training we can utilize better the interview as a scientific approach to matching human capacity and job requirements, and, by supplementing the interview with thorough investigation, a good physical examination and proper test results, we are confident that we are increasing materially our effectiveness in putting the right person in the right place.

Plant tour at Electro-Motive Division during the Thirteenth Annual General Motors Medical Conference. Note safety glasses worn by every visitor. This Division has a complete eye protection program. Left to right: K. S. Hedges, D. T. Mould, John Anderson, Dr. Richard Swan, Dr. A. L. Abbett, Dr. N. E. Leyda, Dr. E. E. Chiarulli, Dr. E. J. Nugent, Dr. Edwin DeJongh, Dr. B. V. Myers, Dr. J. H. Ganschow, and Dr. M. C. Kiser

Employment Testing

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IN ALL phases of the personnel program in industry, a multitude of predictions must be made as to the individual's ability to succeed. This is especially true in the employment office where the interviewer must appraise the applicant's background, work history, education, abilities, skills, interests, and personality in terms of the requirements of the job for which he is being considered. It is obvious that mistakes are costly in time, material, efficiency, and morale, and are becoming increasingly difficult to adjust satisfactorily. Since it is important that decisions be based on information that is sound and accurate, there is a trend away from rule-of-thumb methods toward the use of more scientific instruments that will reduce to some extent, at least, the "guess-work" of the past.

Tests are additional tools that have been developed to supplement and refine the interview by providing specific information regarding the individual's general ability, aptitudes, skills, job information, interests and personality. Often information is obtained more economically with the use of tests. In other instances it is practically impossible to secure accurate, objective information without their use. For example, such things as dexterity, speed and accuracy in clerical work, and basic mechanical ability cannot be measured in the interview. Since people differ greatly, and the interviewer's observations of the applicant must be limited, tests assist in measuring personnel so as to eliminate bias, prejudice, and the inaccuracies in human judgment.

It is hardly necessary to say to this group that tests are not a panacea for employment ills, but their intelligent use, combined with skillful interviewing and selective placement in terms of physical capacities, will do much to improve any program of selection and placement. Tests do not offer a final answer to all selection problems in industry, and it is not expected that they ever will. Tests are not foolproof, and their usefulness depends upon their validity in measuring the key demands of the job they are supposed to measure. Thus, their effectiveness must be based on careful study and research. Since tests do not make the decision, but only provide more accurate evidence on which sound judgments can be made, they must be used and interpreted by persons whose background of training has made them aware of the weaknesses and strengths of available measuring techniques.

There is no longer occasion for question as to whether tests can contribute to improved selection and placement. The experience of a number of divisions of General Motors, as well as that of hundreds of other companies, business concerns, and the armed services, has shown that testing has value. So, in considering the use of tests, a company is faced with the question of the degree to which testing can be helpful, the specific applications of testing to its problems, and the best methods of inaugurating a program that will be practical and helpful.

In keeping with General Motors' highly decentralized pattern of operation, one can see a variety of practices in the use of tests in the corporation. Some divisions have found tests valuable aids in selection and placement for a wide variety of production, office, and supervisory jobs. Others have limited their use to the selection of clerks or stenographers, or in picking apprentices or cooperative engineering students. In still others, tests have been used only in the selection and study of foremen or supervisors. Some divisions have had no experience with tests. Others are planning limited applications in the near future, and at the present time our staff is establishing testing programs in eight of these plants.

Illustrations of improvements in placement which can be effected through the use of tests can be seen in the reports of different jobs of the kinds found in the various divisions of the corporation. In some of our divisions tests have been used in the selection of employees for jobs requiring a high degree of dexterity and skill. It has been found that if applicants with the right abilities can be identified during hiring, not only can subsequent production be improved, but training time can be reduced, and employee failures can be avoided.

In the AC Spark Plug Division, for example, tests have been used to select precision assemblers. A battery of tests was administered to a group of applicants and the results were compared with their later performance on the job.

Fig. 1 shows how performance was related to the test scores. The length of the bar represents the percentage of employees above average in performance. The top bar shows that 94% of those who were in the highest third on the tests

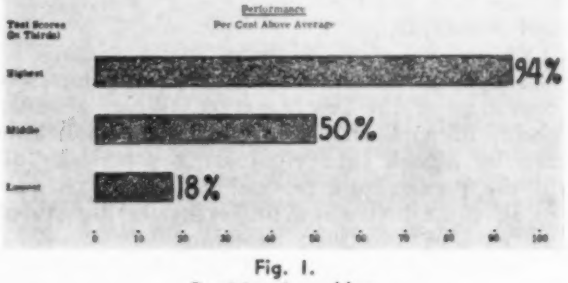

Fig. 1.
Precision Assemblers

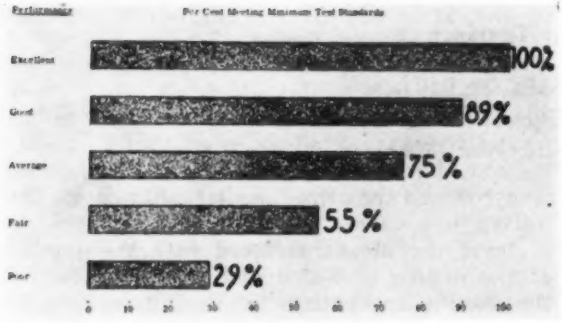

Fig. 2.
Hand Polishers and Buffers

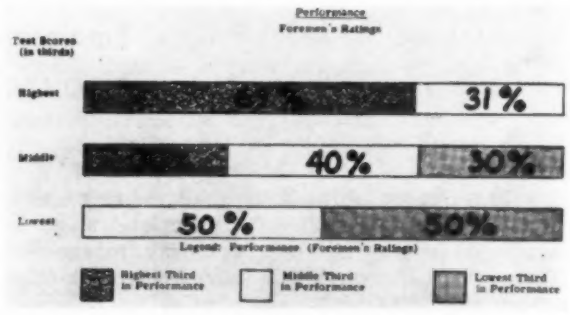

Fig. 3.
Job Setters

were above average in performance. The middle bar shows that 50% of those who were in the middle third on the tests were above average in performance. The lowest bar shows that only 18% of those who were in the lowest third on the tests were above average, while the remaining 82% were below average. Subsequently, by selecting only those applicants whose scores were in the top third of the test scale, the production of the department was increased markedly. The selection of people who found this type of work easy and interesting contributed to high morale in the department and an excellent production record.

In staffing the new AC—Milwaukee plant, the valuable experience with tests used for selecting precision assemblers in Flint during the war found immediate application in the choice of personnel for the fabrication and assembly of high-precision bombsights and other aircraft instruments.

In the Brown-Lipe-Chapin Division in Syracuse, New York, and Elyria, Ohio, a large number of hand polishers and buffers are used in the manufacture of hub caps, bumper guards, and die cast ornaments. Selection for this job presented difficulties, and there was high turnover, together with excessive production costs. The improvement resulting from the use of tests in selection can be seen in Fig. 2.

On the left are the supervisor's ratings of employee performance. The top bar shows that of the men considered as "excellent," 100% had met or surpassed the minimum test standards. Glancing down the chart, it can be noted that the percentage meeting the test standards decreases with the ratings of performance. Thus, of the men rated as "poor," only 29% met the test standards.

This study also illustrates that standards of selection cannot be considered apart from the condition of the labor market. When a wider choice of applicants is available, the standards can be raised, thus eliminating practically all of the poorer workers, and making it possible to select an increasing proportion of men rated as "excellent" by their superiors.

Another study deals with the selection of machine job setters or set-up men. This job is found in most of the General Motors fabricating plants, and requires a fairly high degree of mechanical ability and skill. Placement on the job is through promotion from less skilled production work. Often future foremen are selected from men in this classification.

Here the worker inserts and adjusts cutting and shaping tools, guides, stops, and working tables into semi-automatic and automatic machines. After setting up the machine, he operates it for a brief period to see that it is functioning properly and fabricating parts within the tolerances allowed. Then he turns the machine over to the production operator. It is obvious that lack of skill in set-up will result in machine downtime, excessive scrap, tool breakage, and numerous other items of increased cost. In some cases poor set-up may shut down an entire line. Therefore it is highly important that men be selected carefully for this job.

In Fig. 3 we see a comparison of the scores on a battery of several selection tests and the performance of these men based on their foreman's ratings. Of those in the highest third in test scores, 69% were in the highest third in performance; 31% were in the middle third; but none was in the lowest third in performance. Of those in the lowest third in test scores, none was in the highest third in performance; 50% were in the middle third; and 50% were in the lowest third in performance. If job setters were selected only from those in the highest third, considerable savings would result in tooling, materials, training time, and production.

All companies are faced with the problem of selecting effective supervisors, foremen and executives. In a number of General Motors Divisions tests are now being used to supplement other information about the candidate. Recently, for example, all of the first-line foremen were tested in the Buick-Oldsmobile-Pontiac Assembly plant in Linden, New Jersey. The tests given covered learning ability, shop arithmetic, mechanical ability, understanding of supervisory practices and human relations, vocational interests, and personality adjustment. At the same time, these men were evaluated as to their performance as supervisors. Norms are now being set up based upon the successful performance of men in this

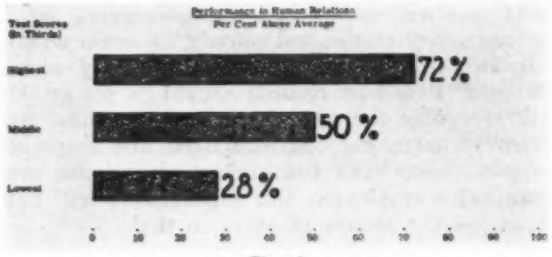

Fig. 4.
Operating Supervisors

group. These standards can be used for selecting new foremen in this plant, as well as in five other Buick-Oldsmobile-Pontiac Assembly plants in various parts of the country. Similarly, tests for supervision are being used by such other Divisions as Frigidaire, Fisher Body, AC Spark Plug, Oldsmobile, Inland Manufacturing, GMC Truck and Coach, and Delco Products.

One of the chief factors in supervision is the ability to get along with people—with employees, associates, and superiors. Measuring skill in human relations is difficult either through tests, or ratings, or other evaluations. This study, however, is an example of an attempt in that direction. A group of supervisors was given a test designed to measure their insight into human relations problems and their ingenuity in solving them. At the same time, they were evaluated by their superiors as "above average" or "below average" in their ability to handle human relations problems on the job.

It can be seen in Fig. 4 that 72% of those who had made the highest scores on the test were also considered by their superiors as "above average" in handling such problems on the job. Of those in the lowest third on the test, only 28% were classified as "above average." The indications are that even in such intangible problems, tests can be devised which will identify persons who have more competence than their fellows. Any improvement in the selection of supervisors will have a far-reaching influence on the total plant situation.

These have been but a few of the many examples that might be used to illustrate the application of tests in the selection, placement and evaluation of personnel.

WE ALL know of instances where tests have been used effectively by some companies. We probably know of others who started out hopefully, but were disappointed. Why did testing work in some and not in others? Under what circumstances will a testing program pay off? Experience has shown that there are certain basic essentials:

1. *Before attempting to establish a testing program, there must be understanding and cooperation of top management, supervisory personnel and employees.* Management must have full confidence in the larger outcomes as well as the immediate results of such a program. There must be understanding of the necessity of initial research, and the realization that considerable time and study may be needed to prove its values. Management should not expect miracles, but understand the limitations of testing as well as the values.

Supervisors and department heads must be "sold" on its values to them. They must understand its purposes and see that it provides additional, more objective information, on which *their* decisions can be made. In this way, it reduces their personnel headaches, and their jobs are made easier.

Employees must be acquainted in advance with some of the values of testing. They should realize that tests are only one factor in selection, that no one's job is jeopardized, nor is his future threatened when tests are used. When care is taken in placing an applicant on a job for which he has the necessary abilities, skills and interest, his own respect for the standards of the job and the company is raised. Proper placement enhances his sense of importance and personal worth. To have a right to a job in terms of his own skills and abilities increases his confidence in himself, stimulates his desire for self-improvement, and enhances his motivation to make good. An employee appreciates the fairness of protecting him from placement on a job where he will fail, or from an excursion down a blind alley. Proper placement will enable an employee to do the job more easily and quickly, live up to the production schedule set for a fair day's work, and mark him for promotion when the opportunity arises. In all, placement on a job he can do well, one suited to his abilities and interests, makes him a happier employee. He is satisfied with the job and the company is satisfied with him. His interest and morale are high.

2. *Tests must be part of an integrated selection program.* Information obtained from tests should supplement that secured from other sources—from the industrial physician, the interviewer, references, application blanks, and other personnel records. There are many aspects of an employee's work performance that cannot be predicted from tests. The whole individual is not measured by tests, and present instruments are still inadequate for predicting ambition, loyalty, drive, daily efficiency, or success in complex situations. Claims of excessive value must be avoided, since in any testing program we cannot as yet hope to reach perfection, but rather to improve the results obtained over previously unsatisfactory procedures.

3. *Start in a small way, concentrating on jobs where improvements in present practices are greatly needed.* Not all personnel problems can be remedied by a testing program, since the difficulty may lie *not* in selection, but in training, recruitment, supervisory methods, or other factors. Tests are likely to be most helpful in situations where turnover is high, training costs, absenteeism, and waste are excessive, and effi-

ciency and production are low. Starting in a small way on a few jobs, the program can be expanded gradually to others as the need for better placement is shown.

4. *Use qualified personnel.* Where aptitude tests have been used successfully, there has always been a well-trained person in charge. The value to be derived from tests is dependent upon the interpretation of results which are meaningful only when made by a person trained in measurement techniques. There is no simple package approach to testing. It would be better to forget about testing altogether, than to install a fragmentary or unsuitable program under poorly qualified personnel.

A qualified person will be able to analyze testing needs, will know how to select the proper tests, and will understand the methods of determining whether the tests predict success on the job. He will see that tests are properly given, and will know how records should be set up. He will recognize the need for introducing the program so as to get organizational and employee support, and, by a continuous educational program with employees and supervision, will help them see the values of tests to them.

CONSIDERABLE progress has been made in applying new tools to the selection and placement of people. Tests are one of these tools. It would appear that in the use of tests, General Motors has tapped another method of reducing costs, improving operational efficiency, and increasing job satisfaction and morale.

Dr. William D. Tillson, Medical Director, Electro-Motive Division, was General Chairman at the Thirteenth Annual General Motors Medical Conference, La Grange, Illinois

The Foreman's Role in Selecting New Employees and Employee Performance Rating

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IN VIEWING the panorama of new techniques for selection, placement and follow-up, the spotlight has been focused thus far on developments in selective placement, interviewing and employment testing. In examining these developments we have seen how the industrial physician, the interviewer, and the testing technician have important roles in the selection process. In continuing the narrative of new techniques, let us now turn our attention to the role of the foreman in selecting new employees and rating employee performance.

When people are regarded as the greatest asset of an organization it seems entirely obvious that the term connotes capable people working together to attain a definite objective. Applying this principle to our selection, it is axiomatic that the people who are being employed today are not only expected to function as a part of the team but, more particularly, they are the General Motors of Tomorrow.

From the standpoint of self-preservation it is, therefore, imperative that the selection and placement of employees be undertaken with the view to obtaining the best available talent and placing that talent in a situation where it will develop on a mutually advantageous basis. Thus, in working in the area of our greatest asset, the job of selecting the right people and placing them is a serious responsibility. Moreover, any mistakes which are made in the performance of this responsibility are quite costly. Recent studies in General Motors show that the cost of replacing an employee will vary from plant to plant, and from job to job in a plant, but the average cost amounts to at least $100 per replacement. Other cost factors, such as low productivity, tool breakage, discipline and the like, merely pyramid this replacement cost.

To understand the foreman's role in the selection and placement of new employees, we first need the perspective of the general functions of a foreman in General Motors. In this connection we will find that foremen assist in the formulation of the detailed policies of the business and have executive responsibility in the effectuation of these plans and policies particularly as they apply to employees under their supervision. Continued analysis will reveal that the foreman is the manager of his department. He is responsible for the efficiency of the employees who work under his direction. He is also responsible for maintaining discipline. He makes work assignments and issues instructions. He makes the first management decision on complaints. Morale and good human relations are likewise the primary responsibility of the foreman. In short, the foreman is vested with the authority of management, and is the highest authority in his department.

As a result of the foreman's intimate knowledge of the various operations and his day-to-day relationship with employees, he is eminently qualified to take a leading role in selecting employees and rating their performance. Unfortunately, there has been a tendency to view these two matters as separate entities without too much thought being given to their common heritage. This was the situation in existence at the Delco-Remy Division about two years ago. While we had a selection procedure and a rating program which were functioning in a normal manner, the fact remained that the end results were not completely satisfactory. This was especially true of the employee rating program. It had become increasingly evident that our rating program was both inadequate and ineffective as a rating device. It was equally obvious that either a major repair job or a new model was in order.

In seeking a solution to this problem, a committee was formed to make a thorough study of the matter and adopt appropriate remedial measures. This committee was composed of 25 members and consisted for the most part of representative foremen from all activities in the plant, together with a few members of the personnel staff. After carefully reviewing the situation the committee determined that it was more desirable to develop a new program than attempt to patch up the old one. During these deliberations it was unanimously agreed that if an employee were satisfactory with respect to his *physical qualifications, mental qualifications, temperament, work habits* and *personal characteristics,* he would be a desirable employee. It was also agreed that these factors apply not only to employees who were already working for us but also to those we might expect to hire from time to time. The committee went on to develop a set of representative questions for each of the five main characteristics.

At this stage it was realized that expert advice and counsel would be needed in designing a program which would be scientifically sound and practical in application. In this connection we were able to secure the help of the American Institute for Research which had considerable experience in this line of work. After reviewing the problem it was agreed that research would

be undertaken on the basis of the Critical Requirements Approach. To conduct this research it was necessary to enlist the aid of the entire supervisory organization consisting of some 600 foremen. These foremen gathered the basic research data on unusually effective and unusually ineffective employee behavior. Something in excess of 2500 critical incidents were analyzed, classified and reduced to 33 basic items which came within the scope of the original five headings. However, it still remained to be seen whether the foremen could use this yardstick effectively in evaluating the performance of employees on the job. In resolving this matter to a final conclusion an experimental two-week tryout was carried out with 120 foremen participating. The results established that the foremen could observe incidents of unusually effective and ineffective behavior, and further that they could classify and record such incidents in one of the categories and areas previously described. Accordingly, the plan was placed in effect.

THE development described was a project which was conducted by and for foremen. Of particular importance is the fact that this program is objective rather than subjective in nature. The pattern emphasizes actual observations rather than general impressions, objective behavior instead of conjecture, and facts instead of opinions. Of equal significance is the fact that the specific traits and the critical requirements which are essential to successful performance on the job apply not only in the area of rating but also to selection and placement.

Certainly if we wish to improve our initial selection procedure, then we must learn as much as we can about an applicant's physical qualifications, mental qualifications, temperament, work habits and personal characteristics. These findings are then compared with the critical requirements of the job in order that wise selections may be made. From a procedural standpoint it is entirely obvious that it is not practical for each foreman to run an employment office in addition to attending to his other duties. In resolving this matter the employment staff functions as his agent in screening applicants and supplying needed help from time to time. However, the selections which are made are subject to approval by the foreman. Since the hiring criteria consist of the critical requirements of the job, the employment staff and the foremen are thinking and talking the same language. In short, they are using the same yardstick for selection that will subsequently be used to measure performance on the job. This feature is an important step in increasing the effectiveness of the selective process.

Another phase of selection occurs at the end of the probationary period. In this connection it should be explained that new employees are hired on the basis of the understanding that they will be given the opportunity to learn and do certain assigned work and will be retained only if they can satisfactorily perform this work. The decision to retain or release is based on the employee's objective performance as observed by the foreman. In this regard, the foreman rates the performance of new employees on two occasions during the probationary period. Each appraisal is reviewed with the employee. These ratings reflect the objective evidence upon which the foreman makes his decision to retain or reject at the end of the probationary period. In addition, each of these ratings is sent to the employment department for examination and analysis. By this means the employment staff can compare its own hiring data with the subsequent performance data. This procedure serves as a constant check on the effectiveness of initial selection.

In appraising the performance of our permanent employees, it becomes highly important that the foremen have a tool which will assist them in conveying to employees a clear understanding of the critical requirements of the work. Moreover, they need an effective method in identifying those who can and do perform well. Such a tool is of invaluable assistance in giving praise where praise is due and in selecting candidates for promotion. By the same token, the foreman needs a tool which will assist him in identifying those who cannot or will not do the assigned work. In this connection he needs tangible evidence of undesirable performance as a basis for corrective measures. In either instance the performance rating together with its supplemental data gives him the objective data which are essential to good management.

We must be ever mindful of the fact that the management of people is an extremely important function. In this connection we have seen that the foreman occupies a key position in the areas of selecting, placing, and rating employees. If he is to do these jobs well it is obvious that he needs the best tools available. While this program has not been in effect long enough to provide a detailed analysis of accrued results, it may be pointed out that the initial reports are promising and indicate that the program already is assisting the foreman in doing a better job of selection, placement, and appraisal of employee performance.

Evaluation of the Employee's Attitude

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Electro-Motive Division, General Motors Corporation,
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IN A LARGE organization it becomes impractical for members of the Industrial Relations Staff to conduct periodic interviews with each employee to determine the extent to which he is satisfied with his job. Considerable time and effort are spent in the selection and placement program which provides the Industrial Relations Staff with an opportunity to do a thorough job with each person. The emphasis of the previous speakers has been on some of those techniques which increase our opportunities in the selection of our people. Yet, we must not overlook the important aspects of follow-up. The best selection and placement process can fail to do the ultimate job of increasing productivity and efficiency if one does not consider the employees' needs, wants, and desires after they have been placed on a job. Since this is an intangible area, and since it is impractical or at least unwieldy to conduct personal interviews with every employee after he has been placed, it becomes necessary to seek out a means by which management may, at periodic intervals, take the pulse of the employees as a group. It is my purpose to outline briefly, a technique with which we have experimented within our organization.

A QUESTIONNAIRE was devised and pre-tested in the Detroit Central Office of General Motors in order to make the necessary revisions before administering it at Electro-Motive Division. The questionnaire was divided into three sections—each designed to use a different approach in finding our employee's reaction to their jobs. The first section concerned itself with an average day on the job, and gave the employee an opportunity to respond to a series of facial expressions rather than using words in giving his reaction to specific factors of the job. This was an entirely new approach. It might be interesting to see some of the kinds of situations which were offered to the employees.

Try to imagine yourself in the situation described, then put a check ☑ under the face which most nearly fits the way you usually feel in that situation.
If you are requested to work overtime
At home in the evening as you consider things in general, how do you feel about your job?

Situations to which the employee was to respond were:

1. As you travel to work.
2. As you face your day's work.
3. As you think about your fellow workers.
4. When you deal with your boss.
5. When you look around the place where you work.
6. When you think about your future.
7. Whenever you think about your division's future.
8. Whenever you think about how EMD is managed.
9. When you get your check on payday.
10. If you are requested to work overtime.
11. At home in the evening, as you consider things in general, how do you feel about your job?

Examples of the above situations are shown in the accompanying illustrations.

The second part of the questionnaire considered the job in detail. Here, standard choice items were given. Examples of a few of these follow (See "Your Job in Detail" and "What Makes a Good Job," on page 411).

The third section was essentially a write-in section and gave the employee an opportunity to amplify or state any additional remarks that he wished to make about his job. He also was given an opportunity to write out questions to which he desired answers.

After the questionnaires had been returned, it was found that the over-all rate from the division was 26%. Although this was considered an excellent return for mailed questionnaires of this type, it was too low to provide adequate evidence that it was representative of all salaried employees at Electro-Motive Division. In order to deter-

Whenever you think about your division's future
Future
Whenever you think about how EMD is managed
When you get your check on payday

Try to imagine yourself in the situation described, then put a check ☑ under the face which most nearly fits the way you usually feel in that situation.

When you have lunch in the cafeteria

As you think about your future

As you think about your fellow workers

When you deal with your boss

When you look around the place where you work

mine the accuracy of the questionnaire results, 10% of the salaried employees, selected on a strictly random basis, were interviewed by a group of specially trained graduate students of Northwestern University under the supervision of the Employee Research Section. Following a thorough analysis of these approximately 200 interviews, the results were compared with the questionnaire and showed constant agreement. Thus, it was possible to say that the 26% questionnaire return produced results which were representative and reliable.

Without going into detail on the answers to this questionnaire I will indicate some of the high spots of the findings. The items of chief concern seemed to be:

1. Lack of personal concern on the part of supervision toward subordinates.
2. Too little opportunity for advancement (due in many cases to a feeling of need for more training).
3. Infrequency of merit raises.
4. Lack of knowledge about pay policy.

There was an earnest desire for more training and more information about: (1) the job, (2) the product, and (3) the company. The survey also indicated that Electro-Motive Division's salaried employees in general were satisfied and happy with their job and the people with whom they work. There is strong interest in the work of the division, and particularly its dramatic product. Electro-Motive Division's future looks especially bright to most salary employees. Top management is liked personally and considered capable. Because of this high esteem for top management, those things that are considered unsatisfactory are causing strong feeling. It was felt that top management does not know about them or something surely would be done.

AFTER the survey findings had been carefully tabulated and analyzed the results were presented to top management where it was decided:

1. That the employees were entitled to a report on the survey and that the questionnaire booklet with the percentage figures overprinted and the summary of total responses be prepared and sent to each salaried employee whether he participated or not. With this questionnaire would go a cover letter explaining the survey and what was to be done with the results.

2. All questions asked in the survey would be answered. However, since some of the questions were personal in nature and could not be treated on a general basis, it was decided that in addition to sending letters at periodic intervals to cover the general areas of policy and practice, a composite would be made of all of the personal kinds of questions and sent to all supervision. In the composite, no employees would be identified with their questions since the confidential nature of the questionnaire had been established at the time it was sent out. However, employees were advised that they could secure the answer to personal questions such as "Why don't I get a raise," by talking to their supervisors, or, if they were reluctant to do that, to a representative of the Industrial Relations Department.

3. That management should hold further meetings where the real problem would be to find out why certain of the questions had been asked. This would assist management in carefully examining its thinking regarding policy and policy administration.

4. That the management group itself should review the answers to many of the questions raised by the employees.

The management felt it important that, as a group, they come to decisions with respect to policy and practice, prior to making any efforts to explain or answer things brought up by the employees.

5. That additional surveys should be made in the future to check the effectiveness of management actions growing out of the present survey findings.

SINCE the survey completion several things have been initiated which the employees can ascribe to the survey:

1. The office cafeteria has been remodeled and enlarged.
2. The concessionaire of the factory cafeteria has been changed.
3. A service recognition program has been instituted.

4. The recreational program has been expanded in line with certain employees' requests made during the survey.

5. Reports on the survey with a covering letter by the General Manager are in the employees' hands. Additional letters covering policy points will be forthcoming. As of now, a letter setting forth the salary policy has been mailed.

It is our feeling that this follow-up approach produced valuable evidence on which we could arrive at some management decisions. We plan to use techniques of this kind in the future, since we are convinced that such an approach produces the kind of answers we need in the most economical and efficient fashion.

Your Job in Detail

YOUR general impressions of various situations in your day at work are important in any study of your job.

But to be truly practical, we must get down to cases. The following subjects were picked because they seemed to be important on a job—please check (√) your reactions. *Skip anything that does not interest you.*

Most of us when we started to work at EMD needed some special training or instructions to do our job right. When you started to work at EMD, were you told enough about—

EMD—its history and product?	☐ Yes	☐ No
Working hours?	☐ Yes	☐ No
Benefit plans?	☐ Yes	☐ No
EMD rules and policies?	☐ Yes	☐ No

When you were assigned to your first EMD job, did you receive—

- ☐ Sufficient instruction to be able to learn the job quickly?
- ☐ Just enough instruction to get by?
- ☐ Too little instruction to help me do a good job at first?

Some supervisors are better than others in helping the people working for them with problems about the job. We'd like to know which of the following statements best describes your boss.

- ☐ Never get any help from him at all, in my work
- ☐ He seldom has anything helpful to offer
- ☐ He is sometimes fairly helpful
- ☐ He is usually quite helpful
- ☐ He always gives me all the help I could possibly want in my work

Putting it another way, when you need help in your work do you—

- ☐ Usually ask the boss for help?
- ☐ Sometimes ask him?
- ☐ Never ask him?

Sometimes a supervisor is the kind of a person you feel free to go to and talk with about personal or family problems. Which of the following most nearly describes your boss?

- ☐ He shows real interest in helping me with personal and family problems
- ☐ He is usually willing to help
- ☐ Sometimes he seems interested in me
- ☐ He seldom shows any interest in my personal and family problems
- ☐ He has never paid any attention to my personal and family problems

However, when you have a problem or need advice on personal and family problems, do you—

- ☐ Usually ask him for help?
- ☐ Sometimes ask him?
- ☐ Never ask him?

Close to anyone's heart is the pay check. In general, how do you think salaries at EMD compare with the salaries in other companies in this area?

- ☐ Better than most other companies in this area
- ☐ About the same as other companies in this area
- ☐ Poorer than most other companies in this area
- ☐ Don't know

Do you think you receive a fair day's pay* for the work you do here at EMD?

☐ Yes ☐ No ☐ Don't care to answer

Many companies give pins and other means of recognition varying with the years of service. What do you think of this practice?

- ☐ It's a very nice thing
- ☐ It would mean little or nothing to me

The "Streamliner," "G.M. Folks" and the "G.M. Executive Bulletin" are YOUR publications. Do you read them?

	Streamliner	*G.M. Folks*	*G.M. Executive Bulletin*
I always read it.	☐	☐	☐
I read it occasionally.	☐	☐	☐
I never read it.	☐	☐	☐
Does your family read them?			
No one else reads it.	☐	☐	☐
Other members of the family read some parts of it.	☐	☐	☐
I'm asked about it if they can't find the current copy of it.	☐	☐	☐

Do you have any suggestions for changes or additions that would make these publications more interesting to you?

.....

.....

Most people are rather fussy about their food. What do you think about the cafeterias?

Do you eat in the "Office" Cafeteria?

☐ Frequently ☐ Sometimes ☐ Never

Have you found the food to your liking?	☐ Yes	☐ No
Is there enough variety?	☐ Yes	☐ No
Are the prices reasonable?	☐ Yes	☐ No
Is the service satisfactory?	☐ Yes	☐ No

Do you eat in the "Shop" Cafeteria?

☐ Frequently ☐ Sometimes ☐ Never

Have you found the food to your liking?	☐ Yes	☐ No
Is there enough variety?	☐ Yes	☐ No
Are the prices reasonable?	☐ Yes	☐ No
Is the service satisfactory?	☐ Yes	☐ No

What do you think of the entertainment?

	Like	*Dislike*
Movies	☐	☐
Organ Music	☐	☐
"Streamliner"	☐	☐

*Remember that your "take-home" pay is not the salary EMD pays you but what is left after deductions.

	Like	*Dislike*
"Dieselaires"	☐	☐
.....	☐	☐
In general	☐	☐

Would you like to participate in any of the following activities with your fellow workers?

☐ Picnics
☐ Parties
☐ Card clubs
☐ Dances
☐ Amateur shows
☐ Fashion shows
☐ Glee clubs
☐ Tours
☐ Public speaking classes
☐ First aid classes
☐ Barbershop quartets
☐ Chess and checkers
☐ .....

What do you think about having your family (wife and children) also participate in any of these activities?

☐ Very much in favor of it
☐ It might work out well
☐ Don't think it would be a good idea

Other suggestions .....
.....
.....
.....

What Makes A Good Job?

INDIVIDUALS differ in their ideas about just what makes a good job. Below are listed some of the things that were mentioned most in the "My Job Contest" letters.

Will you check off the four (4) which YOU consider most important?

Then, in the second column, check *any* that are satisfactory on your present job.

	4 Most Important for a Good JOB	*Those That are Satisfactory on your JOB*
Chance for Advancement	☐	☐
Fellow Workers	☐	☐
Immediate Supervisor	☐	☐
Kind of Work	☐	☐
Pay	☐	☐
Plant Location	☐	☐
Security	☐	☐
Steady Employment	☐	☐
Working Conditions	☐	☐
Any Others	☐	☐
.....	☐	☐

General Motors Service Award Presentation

ONE of the happy surprise features of the General Motors Thirteenth Annual Medical Banquet, held at the Medinah Country Club on Monday evening, April 24, was the Service Award Presentations made by DR. MAX R. BURNELL, Medical Director of the Corporation.

Five past and present Medical Directors of General Motors plants received gold wrist watches in recognition of their total of 135 years of service in their posts. They were:

DR. C. A. LEATHERMAN, Medical Director, Delco-Remy Battery and Chevrolet plants, Muncie, Indiana, 31 years;

DR. A. A. TOWNER, Medical Director, New Departure Division, Meriden, Connecticut, 28 years;

DR. A. F. LECKLIDER, Medical Director, Fisher Body Divisions, 28 years;

DR. M. M. SHAFER, Medical Director, Frigidaire Division, Dayton, Ohio, 26 years; and

DR. JOHN LAMBIE, retired Medical Director, Fisher Body Division, Pontiac, Michigan, 22 years.

Left to right: Dr. A. A. Tower, Dr. M. M. Shafer, Dr. Max R. Burnell, Dr. C. A. Leatherman, Dr. John Lambie, and Dr. A. F. Lecklider

Antihistamine Chemicals in the Treatment of the Common Cold
— Report on a Twenty-Seven Month Study —

WILLIAM L. BAUGHN, M.D.,
Medical Director,
Guide Lamp Division, General Motors Corporation,
Anderson, Indiana

THE history of all new drugs for which specific curative powers are claimed is similar in that it begins with a wave of enthusiasm, followed by a surge of doubt and cynicism and then a long, careful, and tedious accretion of facts from which valid conclusions as to the worth of the medication may eventually be drawn.

It is to be hoped that the phases of enthusiasm and cynicism as to the value of the antihistamine chemicals in the treatment of the common cold are passing, and that to the invaluable studies of Brewster, Murray, and others may be added that weight of investigational evidence needed to allow a valid evaluation to be made. The purpose of this presentation is to add to that accumulating weight of data.

This material, admittedly imperfect from the point of view of pure research, has the practical justification that it represents results derived from day-to-day routine administration in a normal type industrial medical department with no unusual restrictions on the subjects, and should be easily reproducible in any other such department.

Two definitions will aid in evaluating this information:

1. A subject or patient, as referred to herein, is an employee who feels he is developing, or has developed, a typical cold and who demonstrates some objective sign of such infection such as swollen nasopharyngeal mucosa, injected conjunctiva, obvious hoarseness, etc., who has no known nasal allergy, and who has no elevation of temperature above 100.4° F.

Many others, of course, were treated, but only those conforming to this picture were used in the statistical analysis.

2. Control. This must be understood to be a subject as defined above, treated with A.P.C. (aspirin-phenacetin-caffeine) compound, plain aspirin, or aspirin-soda combination.

Clearly an inert placebo would constitute a scientifically more acceptable control medication, but it was felt that no patient appearing at our department appealing for relief should receive less than the accepted medicines which it had been our practice to dispense.

Statistics have been compiled covering 18 of the 27 months the study has been in progress. These 18 months constitute the three "cold seasons," October through March, 1947-48, 1948-49, 1949-50. As a base line where needed we have picked up insurance and absenteeism records from the corresponding season 1946-47.

During the study period we have dispensed 43,000 doses of antihistamine medicines for the treatment of 8,079 colds. We have received 4,627 reports which have been included in this analysis. During the same time we have set aside 2,131 controls from whom we have received 1336 reports included in the analysis.

During the study the dosage of the drugs was varied frequently, tending always toward lower dosage and longer intervals between doses. This was found desirable from a practical point of view, owing to the apparent tendency of side reactions to be more sensitive to dosage change, both in frequency and severity, than was the therapeutic response. This introduces a systematic error in the findings for which we have not attempted to compensate. The statistical effect of this error is to put those drugs used in the earlier months of the study in a relatively less favorable light than those instituted at a later date, with respect to incidence of side reactions.

Fig. 1 demonstrates the relative reported effectiveness of seven antihistamine drugs, the control group, and an average for the antihistamine group as a whole. The vertical coordinate indicates the percentage of those reporting who claimed complete relief of symptoms and appar-

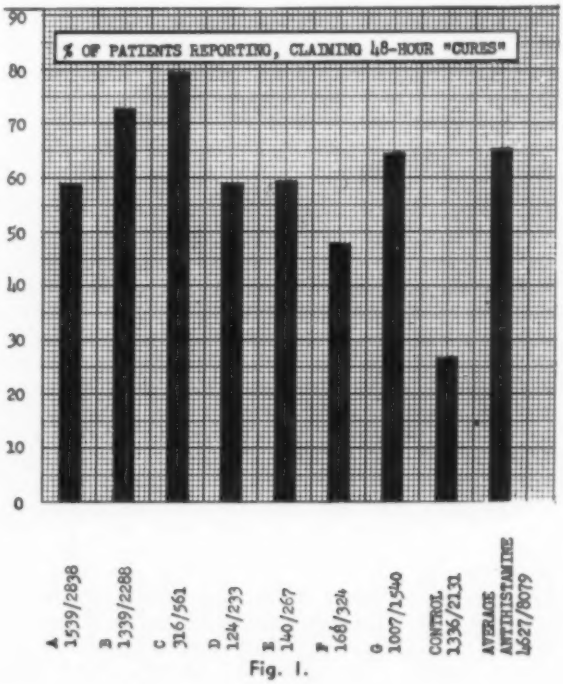

Fig. 1.

ent "cure" of their cold in 48 hours or less. As a matter of fact, a great many of these subjects got complete relief with the first dose or two.

The antihistamine drugs used in this study were Benadryl®, Chlor-trimeton®, Diatrin®, Neohetramine®, Pyribenzamine®, Thephorin®, and Trimeton®. We do not believe it wise in research work of this nature to identify proprietary drugs, so they have merely been marked A, B, C, etc., and are not listed in the order or frequency in which they were used.

Under the letter representing each drug is a fraction, the numerator of which is the number of reports upon which the bar is based, and the denominator of which is the total number of cases treated with this drug. This will give some rough index as to the weight which may be assigned to each sample.

Reading from the left the drugs are graphed in the order in which they were added to the study, with A and B both having been used from the beginning in November, 1947, and the seventh, G, having been added in October, 1949.

Fig. 2 shows the percentage of side reactions reported. No breakdown of types or intensity of these reactions has been attempted. In general our experience here was consistent with published detailed reports. Drowsiness and light-headedness were the most common side reactions.

Reactions severe enough to require bed rest were rare and of short duration but did occur, and such occasional reactions would seem at present to be a universal risk with any of these drugs. Reduction of dosage and increase of interval between doses will markedly reduce incidence and severity of side reactions. This is most clearly demonstrated by our experience with antihistamine G which has recently been used in dosage of 2 mg. initial dose and 1 mg. every four to six hours with an incidence of side reactions of only 3.4%, which is quite comparable with our experience with the control medication.

Figs. 3 and 4 show an attempt graphically to approach the question of the efficacy of the drugs from more objective viewpoints, the hypothesis being that there should be a negative correlation between the amount of the antihistamines dispensed and lost time due to short-term illness and long-term respiratory disease in our plant population. Since the winter of 1946-47 we have increased the number of patients treated with these drugs from zero to approximately 50% of the total number expected to suffer colds (on the basis of 2½ colds expected per person per year). The double-dash line (A, Fig. 3) shows this trend in terms of percentage of probable cold attacks treated. The single-dash line (B, Fig. 3) shows the percentage of our plant population absent less than seven but more than one day per month allegedly due to illness, averaged for each six-month cold season,, and for the corresponding period in the base season 1946-47. The double solid line (C, Fig. 3) near the top of the graph shows the percentage of short-term absences (over one, under seven, days) for all causes which were alleged to have been due to illness. The burden of this would appear to be that there has been a relative increase in short-term absenteeism due to illness over the

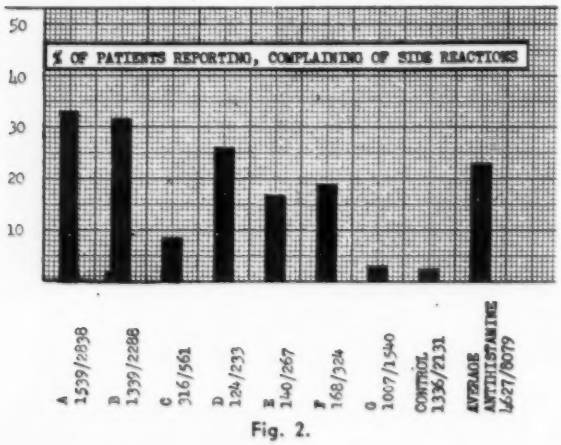

Fig. 2.

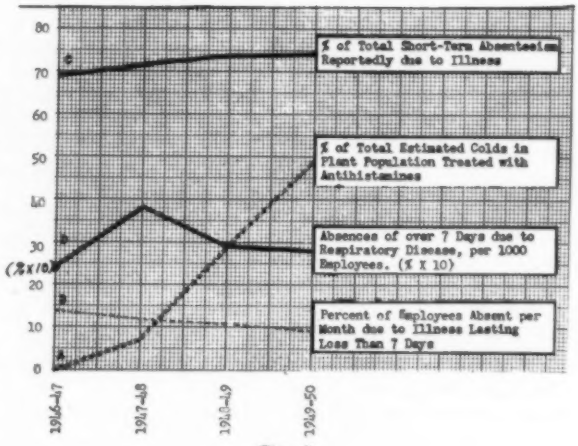

Fig. 3.

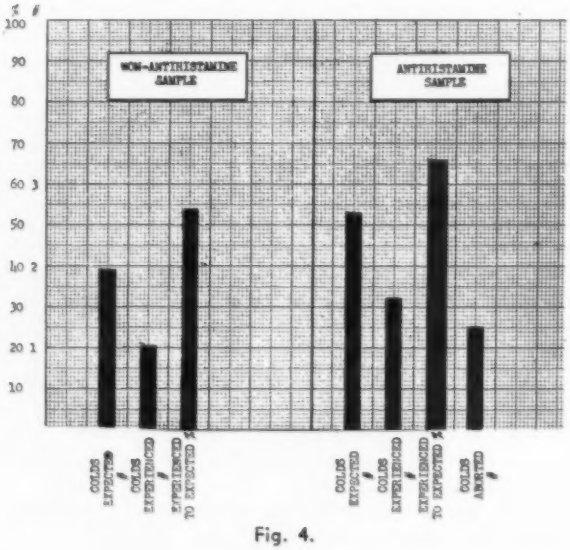

Fig. 4.

period of increasing use of the antihistamines. The heavy black line (D, Fig. 3) shows the number of absences of over seven days, diagnosed as due to respiratory disease, per 1000 employees (% × 10). This evidence appears to show that increasing coverage of our employees with antihistamine therapy has failed to result in any decrease in short-term illness or longer-term respiratory disease.

Fig. 4 is the result of another attempt to test an hypothesis, that a random sample of persons using antihistamine medication during the cold season just past should have had a lower percentage of the number of colds they expect in a usual cold season than those never having used such medication. The left half of the graph depicts the selected sample never having used these medicines, while the right half shows the sample who have used such medicines throughout the past season.

The bar on the left reveals the average number of colds expected by the group on the basis of past experience; the next bar shows the number of fully developed colds of usual length actually suffered this season to March 29; and the third bar shows the percentage of colds expected which have already been suffered. Surprisingly this reveals that the antihistamine takers have already had a higher percentage of their usual number of colds than have those in the non-antihistamine group. In fact, if each person in both samples has exactly one more cold this season both samples will have had their full expected number of colds. This is in spite of the fact that the bar to the right of the antihistamine group reveals that these persons feel that they have definitely avoided 1¼ colds each on the average by use of the drug. Hence, again our hypothesis is not supported by the results of the survey, and it appears that cold experience as against expectancy fails to show any statistical result of treatment with these drugs.

These cross section samples were carefully checked for consistency by repeating the interviews after six weeks and casting out those whose separate estimates as to number of colds expected were at variance. We believe it represents a valid poll.

IN SUMMARY: in 18 months, constituting three six-month cold seasons in the past 27 months, 8079 colds have been treated with 43,000 doses of antihistamine medication of seven different brands. In addition, 2131 colds have been treated with control medication. Antihistamine subjects numbered 4627, and 1336 controls reported and have been used in this analysis. Popular response to the medication was good, an average of 66% feeling they had achieved perfect results in 48 hours. The control group felt they had derived 27% perfect results. Side reactions were reported by an average of 23% of the test group. Severe reactions were rare and transient.

Two rational hypotheses were set up to prove the worth of the drugs in reducing the incidence of fully developed colds and time lost to the plant due to colds, and were treated by objective evidence from personnel records and by a random cross-section poll, without revealing any evidence of the therapeutic efficacy which had been hoped for.

It is felt, however, that the drugs provide excellent symptomatic relief for colds at the cost of some risk of side reactions, and that by careful selection of dose and interval this risk can be made comparable to that run with other standard cold medications.

Discussion by Dr. Ferlaino

FRANK FERLAINO, M.D., Medical Director, New York Offices, General Motors Corporation: The common cold is by far the most prevalent of all diseases which afflict an industrial population. It has often been said the common cold causes an annual loss of a billion dollars to industry. This can easily be calculated.

It is conservatively estimated that the average employee loses two or three days annually as a result of head colds. Sixty million people are presently employed and this group will incur an estimated loss of 180,000,000 work days. If the average daily wage is considered to be $6.00, then the total yearly wage loss would be $1,080,000,000. It is obvious any medication which will control, wholly or partially, the common cold symptoms, and thereby reduce the time lost from work, will be of great interest to both the industrial physicians and management, as well as to the employees themselves. The loss in production (work not produced) is not included in the billion-dollar figure above.

In the hands of physicians the antihistaminic drugs are welcome therapeutic agents for the treatment of the symptoms of the common cold. DR. BAUGHN'S report on the use of antihistaminic drugs in a working industrial group represents the largest single study of its kind to appear in the medical literature to date.

This survey covers an 18-months' observation period in which 8,000 colds were treated. Seven different antihistaminic drugs were used. Some 2,100 colds were treated with a control medication. His report is based on a total of 4,600 antihistamine-treated colds and on a 1,300 control group treated with APC (aspirin-phenacetin-caffeine) compound, plain aspirin, or aspirin-soda combination. The antihistamine-treated group showed a 67% perfect result in controlling the early symptoms of the common cold. The control group treated with aspirin combinations reported 26% perfect results. There was a 41% differential between the two groups. The antihistamine-treated group had the higher percentage of relief.

In DR. BAUGHN'S antihistamine-treated group, 23% had side reactions. The side reactions caused by the antihistamine drugs are of great importance to men working with machines. DR. BAUGHN concluded that the symptomatic relief in the treatment of the common cold can only be achieved at a risk of 23% reactions, but with careful selection of dose and of interval between dosages, the risk of side reactions can be reduced. These toxic effects and side reactions have been reported by nearly all clinical investi-

gators. Most reports indicate that there is an incidence of 20 to 30% side reactions.

In another study by TEBROCK,[1] an extremely low incidence of 2.5% of toxic reactions was reported. Also a smaller dosage was equally effective in treating the symptoms of the common cold in an industrial group of 1,745 men and women. By smaller dosage, it is meant in his studies that he used half the average dose ordinarily used in the treatment of allergies. Instead of 50 milligrams, he employed a 25-milligram dose. This appeared to be an excellent procedure and reduced side reactions to a minimum. TEBROCK agreed, from the industrial viewpoint, that in the higher dosages many antihistamines are undesirable because workmen who are exposed to industrial hazards may suffer side reactions such as drowsiness, dizziness, nausea, and nervousness.

The value of antihistaminic drug therapy in the treatment of the early symptoms of the common cold has been a point of major controversy since early October, 1949, when several manufacturers of pharmaceuticals released these medications for non-prescription sale accompanied by an unusually heavy advertising promotion. The Food and Drug Administration implied their safety, when taken as directed, by approval of the sale of these drugs over the counter, but did not indicate thereby their effectiveness when used in the early stages in the treatment of the common cold. Altogether, the FDA is said to have released over 50 types of antihistaminic drugs for sale without prescription. Side reactions from the use of most of these have come to the attention of physicians.

Until additional studies demonstrate exactly what the antihistamines will do in the way of side reactions in a large industrial community they should be prescribed with considerable caution. One over-the-counter-antihistamine product which represents a widely advertised brand, publicized this statement: "a workable plan to help reduce absenteeism due to the common cold is to supply employees with readily available dispensers containing the product to be used by them in factories, plants, and offices." Such free and indiscriminate use of the antihistaminic drugs is open to criticism on many counts, but in particular because of their reported sedative and other undesirable reactions mentioned above.

Employees whose work requires them to be particularly alert should not use the antihistaminic drugs without the plant physician's permission, or before trying out the effects of the drug at home. Employees should likewise be advised to discontinue the use of antihistaminic drugs on the first appearance of drowsiness or other side reactions. They should be instructed that drinking a cup of coffee or cola beverage will counteract the sedative effect of the drugs. It is because of these toxic, undesirable side reactions that the industrial physician must be extremely careful in prescribing antihistamines.

However, the antihistamines have gained in popularity because of their proved abilities to prevent and arrest the profuse and annoying watery discharge so prevalent in the early stages of the common cold. The comfort derived and the beneficial effect keep the employee on the job and make the use of antihistaminic drugs extremely valuable.

Physicians recognize that the dosage of most drugs varies with the individual and is determined by his size and weight. Therapeutic effectiveness varies in the same way. These factors should be considered in prescribing the correct antihistamine dosage and the interval between doses. The allergic history and reactivity of the individual must be considered in prescribing the proper antihistamine. By such discrimination and evaluation the toxicity and side reactions may be reduced to a minimum among workers in industry.

The antihistaminic drugs vary considerably in their effectiveness in controlling the unwelcome symptoms of the common cold. They also vary in the incidence of untoward reactions produced, but the incidence of reactions can be reduced by employing lower dosage schedules as was done by TEBROCK.

Because of the danger to employees on the job, particularly while operating machines on a job requiring skill, alertness and coordination, it is recommended that the antihistamines be given a therapeutic toxicity trial at home over a week-end while the person is not employed and not driving his car in order to ascertain if any of the above mentioned side reactions occur. He will then be prepared to take the particular antihistamine that has been decided upon at the onset of the next cold with a known degree of safety relative to the undesired side reactions. Of course, this is no guarantee side reactions will not occur. However, by this trial method, a suitable antihistamine can be found for the particular individual which will cause a minimum of side reactions.

Observation of a number of reactions, such as severe palpitation and flushed face with dyspnea, have been noted when the drug is taken by patients who are drinking alcoholic beverages. As a result of these experiences, all patients were advised not to mix antihistamine therapy with alcohol. This needs verification, as it appears to occur infrequently.

With the great advances that are being made in antibiotic therapy since the advent of penicillin and streptomycin, it is expected that a suitable antibiotic agent effective against virus diseases may soon be found. However, until a definite and specific antibiotic agent is announced which will be effective against virus diseases of the upper respiratory tract, the only other hope remaining is to develop a satisfactory immunizing vaccine while awaiting the development of either an antibiotic agent or a chemical similar to a sulfa drug.

The antihistaminic drugs will continue to be used by private as well as industrial physicians. They cannot possibly replace the use of antibiotics, sulfa drugs and other forms of therapy when indicated. The physician and nurse must still supervise the sufferer of the common cold, especially when there is a febrile reaction. This speaks against self-treatment.

It is anticipated that safer antihistaminic drugs will be introduced. This will be achieved by changes in chemical structure in such a manner as to make available a product which will have a minimum of side reactions and maximum effectiveness in treatment of the common cold.

It is important to stress to employees that antihistamines alone do not actually cure or prevent the common cold. They appear merely to suppress the early symptoms. The established rules for good health must be followed, since actually the final cure is effected by the body's defense mechanism. Each employee's resistance must be kept at an optimum during the cold season.

There is at present no definite or adequate evidence that the antihistamines act in such a specific way as either to prevent or cure the common cold. No one has expressed the opinion that the antihistamines have any effect whatsoever on the virus of the true common cold; they achieve their success by controlling the early allergic symptoms and discomfort of the common cold.

BREWSTER[2] reported in 1947 and 1949 that all symptoms were aborted in 90% of patients in whom the treatment was begun within one hour after onset. The percentage results decreased proportionately as more and more time elapsed before therapy was started. After 24-hour delay, the use of these medications relieved only 12%. It is apparent from this and other reports of clinical investigators that early diagnosis and treatment are essential, but it is difficult for workers to concentrate on the early diagnosis of the common cold when they are preoccupied with other important matters. The different results of the several investigators are due to errors inherent in all statistics and the fact that an accurate diagnosis of a true virus-caused common cold is extremely difficult to make. The slightest tickle or sensation in the nasopharynx can be misinterpreted as a diagnostic sign of the common cold.

Particularly at its earliest onset, a worker or layman is not prepared or qualified to decide whether he actually has a true virus common cold or just a suspicion of a "head cold," an allergic rhinitis, or a simple irritation. This factor alone leads to error in all statistical and other calculations. Lay persons have erred in treating not only common colds, but sinusitis, tonsillitis, pharyngitis, flare-up of post-nasal discharge, flare-up of chronic bronchitis and bronchiectasis, laryngitis and sore throat as cases of common colds. This error in self-diagnosis is not readily corrected. It has been claimed that colds can be "stopped" when treated in the first hour after onset, but making such an early "first-hour" diagnosis is not easy even for physicians and nurses. Evaluation of all statistics must therefore be made conservatively.

SHAW and WHITMAN[3] reported that 50% of patients receiving placebo therapy in their series obtained symptomatic relief, whereas 53% receiving antihistaminic drugs reported the same. Likewise, HOAGLAND[4] and his associates recently demonstrated that 27% patients receiving inert material (placebo) reported cure within 24 hours. COWAN and DIEHL[5] carried out a control study using antihistaminic agents and ascorbic acid in the early treatment of the common cold and they concluded that these medications did not have any effect on the duration or severity of the infections of the upper respiratory tract. These more recent controlled studies indicate that the so-called cures may have been errors in diagnosis or the condition treated was not a true virus common cold.

SUMMARY: Numerous investigators have reported that much benefit can be derived from the use of antihistaminic drugs in the treatment of the symptoms of the common cold. The antihistamines are not a cure-all. The body defense mechanism still plays an important role in curing the true virus common cold.

1. The indiscriminate use of antihistaminic drugs among workers in industry is to be avoided because of possible side effects. It has been a practice of industrial physicians to remove the worker from dangerous machinery while he is taking antihistaminic drugs.

2. It is advisable to give workers who operate intricate machines a trial therapy period with an antihistaminic drug while off the job, to determine in advance whether there are any undesirable side reactions, such as drowsiness. With the experience gained and with proper instructions from the industrial physician, workers will know in advance whether they can use these new antihistaminic agents with safety while at work.

3. Not all antihistamines cause exactly the same reactions. Therefore, it is a matter of selecting the most effective drug for the individual which will cause the fewest side reactions.

4. All available statistical studies and other scientific data indicate that the antihistaminic drugs have a legitimate place in the treatment of the symptoms of the common cold. Among workers, their effectiveness is limited by the unfavorable side reactions which occur. The specific cure for the common cold, whether it be an antibiotic agent, a sulfa drug or a vaccine, is still to be discovered.

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Discussion by Dr. Thompson

A. B. THOMPSON, M.D., Medical Director, Chevrolet-Saginaw Transmission Division, General Motors Corporation: Absenteeism from upper respiratory infections has always been an important and unsolved problem to industry.

With the introduction of antihistamines as a cure for such infections, can it be stated that we have found a method of treatment that will solve this perennial problem?

Ever since the article by BREWSTER was published in 1947, there has been considerable interest in the antihistamine treatment of the common cold. In a later report BREWSTER stated that 54% of the patients who began the antihistamine treatment within six hours after the first symptoms of a cold appeared, were cured.

Since the greatest cause of absenteeism in industrial plants during the winter months is upper respiratory infections, it would be of considerable economic importance to both the employee and the employer to investigate the antihistamine cure. The question is, if BREWSTER can claim a 54% cure by this method of treatment, can we reduce the absenteeism in our plants caused by the common cold by the same percentage?

Several investigators have presented evidence from surveys, claiming that 75-90% of their patients were benefited. In these surveys, if the cold were not aborted entirely, its duration was at least shortened and the treatment was considered by the patient to be satisfactory.

In all of the investigations reviewed, there has been only one attempt to correlate the antihistamine treatment with industrial absenteeism. MURRAY stated that only seven of 510 patients treated, over a period of three months, lost time from their jobs.

However, there has been no definite attempt to correlate the high percentage of cures with the actual time employees lose from their jobs. In this respect, DR. BAUGHN has made an important contribution to the study. His investigation during the past three years has included three so-called "cold seasons" and three periods when employee absenteeism is high. As indicated in his paper, absenteeism from short-term illnesses has not been reduced but actually has increased by approximately 10% during the use of the antihistamine treatment.

At Chevrolet-Saginaw Transmission Division the antihistamine treatment for employees began in March, 1949, and continued for one year. Only one antihistamine was employed throughout the 12 months. It was the same as DR. BAUGH'S D medication. This was dispensed only to those employees who stated that their colds were of less than 36 hours' duration. No attempt was made to examine the patient. We relied entirely upon the patient's ability to recognize the early symptoms on the basis of his previous experience with "head colds." Since we were not interested in the individual cures, we did not keep an accurate account of the patient's response to medication. We did request, however, that each employee report any side reactions that were experienced. These reactions were small in number.

During the summer months, and especially during August, we were highly encouraged by the number of rhinitis cases that were responding to the antihistamine treatment. Our enthusiasm waned, however, when it became apparent that we were treating pollen-induced allergies, even though the patients had claimed they were not allergic to anything and had never had hay-fever.

In the Saginaw Valley last year the pollen count far exceeded any figure previously recorded. As a result, more people reacted to this increase in pollen concentration and thereby developed an allergic rhinitis which was misinterpreted and considered a head cold merely because they had never had any previous allergic reaction. As soon as the pollen count would rise to a high level, these same employees could be expected to report and ask for "cold tablets" explaining that their relief from the symptoms was complete within a few hours.

The picture of our survey, as a whole, does not reveal such dramatic results. Since our interest was in the cooperative absentee records of the men in the plant, let us examine the results:

The histories of 1140 employees were reviewed. This survey included a group of 534 men who had taken antihistamine (D) for treatment and another group of 606 men who had not been given the antihistamine treatment. The lost time of both groups for the year 1948 was compared with the lost time for the year 1949. Those employees who had not been treated with D lost 533 days during the year 1948 and only 485 days in 1949, for a lost-time average of 0.87 days in 1948 and 0.80 days in 1949. The 534 men who were treated with D lost 752 days in 1948 compared to 636 days lost in 1949, for an average of 1.4 days lost in 1948 against 1.19 days in 1949.

From this survey it can be readily seen that the day loss by the untreated employees was somewhat constant during both years. On the other hand, the treated group improved their absenteeism record by 0.21 days during the same period.

In our plant of 2000 employees, this could represent a total saving of 420 days per year had all of the employees been treated with D. Such a program would involve a yearly expenditure for 40,000 to 50,000 antihistamine tablets.

With this cost factor to consider, it is important to ask: Are we justified in supplying these tablets to our employees when the return in terms of days lost is so minimal?

It must be realized that the variables in this survey are great, and that the customary excuse or pretext for absenteeism is the common cold. The employees who stay away from work for this reason seldom see their family physicians. Therefore, we are unable to verify the purported illness. Furthermore, it is impossible to investigate all absentees.

ALTHOUGH this survey involves only a period of 12 months during which 534 employees were treated with the antihistamine, I believe the results compare favorably and are so closely allied to the results referred to in DR. BAUGHN'S three-year survey that they mad add some weight to his findings.

Until we can have a closer check on employees and the causes of their absenteeism, it will be difficult to arrive at any definite conclusion on the value of the use of antihistamines in industry. Certainly, the use of antihistamines has had little effect on absenteeism at Chevrolet-Saginaw Transmission Division.

THE General Motors policy is one of decentralization; the Plant Manager is responsible for the operations of his plant very much as though it were a private business. This policy of decentralization also applies to the Personnel function. The Personnel Director in a plant reports to his Plant Manager. He is not directly responsible to the Personnel Staff in Detroit. We do not issue orders to the effect that every plant in General Motors must do so and so. We make suggestions and recommendations, but the decision rests with the plant as to whether they will be accepted. On the other hand, each plant is working out procedures and programs in the Personnel field which it feels are best suited to its needs. In a very real sense, each plant is a proving ground and laboratory for new techniques in this field. When one of them develops a program that has proved to be outstanding then it is part of our job to bring it to the attention of all other plants to which it may be applied.

—GEORGE A. JACOBY, Director of Personnel Services, General Motors Corporation.

Accident Proneness: A Serious Industrial Problem — What Can the Industrial Physician Do About It? —

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THE enormous toll accidents are taking in life and health of the population makes an effective accident prevention program as imperative as the campaigns against cancer, tuberculosis or heart disease. Urgent appeals to set up such a program were recently voiced and were mainly directed to industry. In these calls for action the industrial physician was challenged to take a more active interest in the prevention of accidents caused by human failure. Among others, Moorad[1] and Dearborn[2] appealed to the industrial physicians to recognize this part of the safety program as their responsibility.

What can the industrial physician do about this problem?

To answer this question the following examination was begun to learn the extent of accident frequency in a manufacturing plant of the automotive industry and to analyze the findings with special accent on the human factors involved.

Heinrich states in his book, "Industrial Accident Prevention," that 98% of all industrial accidents are preventable. According to figures published by the National Safety Council, about 10% of all accidents are caused by mechanical failure and 90% are due to human insufficiencies. These figures indicate that a safety program has to move in two clearly cut directions. The improvement and maintenance of safe mechanical devices and machines has to be under the constant surveillance of the safety engineer and his staff. The millions spent yearly for new safety devices are still not sufficient. Much has to be done to reduce the 10% figure of accidents caused by machine failure closer to the zero mark. On the other side, the human factors responsible for about 90% of all accidents have become the subject of increased interest in recent years. The psychologist, the industrial hygienist, and the industrial physician have more and more concentrated their efforts to understand the mental and emotional pattern of the accident-frequent person.

Most writers have approached the problem from the psychological point of view and have tried to explain and analyze the accident-prone personality with the tools of modern psychology. Few statistics are available, however, to show the actual scope of the problem. Tiffin,[4] in his

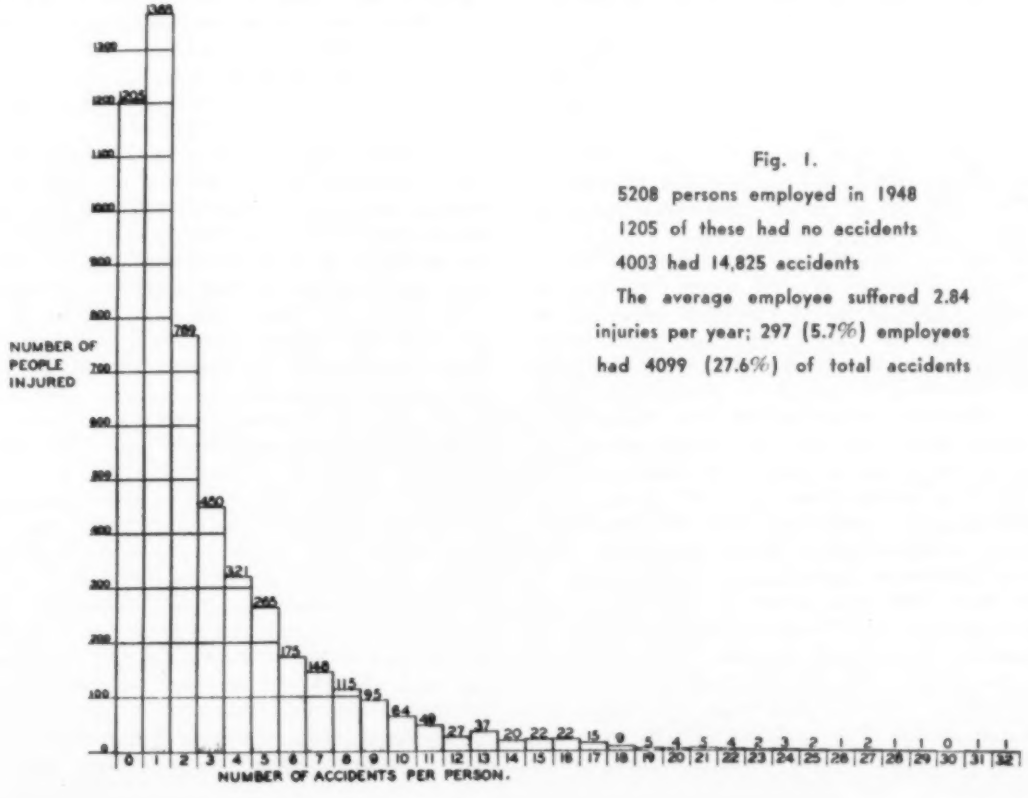

Fig. 1.

5208 persons employed in 1948
1205 of these had no accidents
4003 had 14,825 accidents
The average employee suffered 2.84 injuries per year; 297 (5.7%) employees had 4099 (27.6%) of total accidents

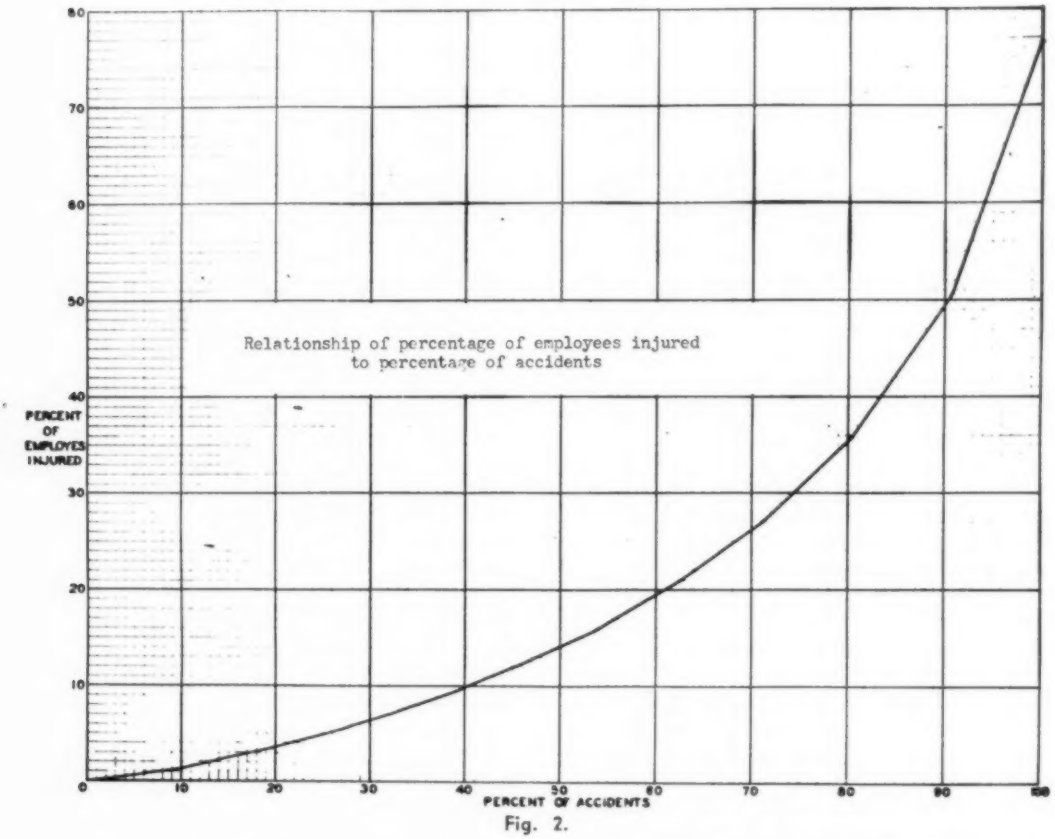

Fig. 2.

"Industrial Psychology," discusses the accident frequency in a large steel mill over a two-year period. His figures and the conclusions he has drawn from them have thrown much light on the subject. A small percentage of employees was found responsible for the majority of the accidents. Statistics published by Metropolitan Life for a two-and-a-half year period show that 2% of employees are responsible for 30% of the accidents. Estimations in some industries claim that 15% of the employees are causing almost 100% of the accidents.

Such figures certainly will vary from industry to industry and will depend upon the type of operations and the specific hazards encountered in each industry. There are, to my knowledge, no statistics available to show the extent and the causes of accident frequency in a stamping plant.

The following investigation was undertaken in a large exclusively manufacturing plant employing a yearly average of about 5000 workers. This plant produces practically all parts of an automobile body, metal as well as trim, from the basic materials, sheet metal and cloth. Only a few sub-assembly operations are performed.

The year 1948 was taken as the period for the investigation and every accident reported to the medical department for this year was compiled in a specific file. A total number of 14,823 injuries was reported and made the basis for this examination. This number sounds high but is easily explained by the strict company policy which requires employees to report every minor injury to the medical department. By far the majority of these injuries consists of minor lacerations and contusions; only nine resulted in lost time during the entire year 1948. Employees to the number of 5,208 were involved in these accidents. The yearly turnover in employment is responsible for the figure higher than the average employment. Fig. 1 shows the relationship between the number of people injured and the number of accidents per person. The surprising fact is the figure of the first column; 1,205 workers, or 23.1% of all hourly employees, had no accident, not even minor ones, throughout an entire year. Many of these men and women work in the most hazardous operations, handling razor-sharp sheet metal, and operating punch presses and sewing machines.

The over-all average of total accidents (time-losing and non-time-losing) was 2.84 per man for 1948. During this period there were 7,365,-454.3 man hours worked. Therefore, an employee was injured every 496.8 man hours worked, or there were 2,011 injuries for every million man hours. It should be emphasized that the term accident frequency as used repeatedly in this paper refers to every type of accident occurring, major and minor, time-losing and non-time-losing and should not be confused with accident frequency rate as defined by the American Standards Association which is followed by the National Safety Council in compiling its records,

and refers only to the number of *lost-time accidents* per million man hours worked. During 1948, according to the A.S.A. definition, this plant had a frequency rate of 1.22, which is excellent.

In Fig. 2 a graph has been developed which shows the relationship of the percentage of employees injured to percentages of accidents.

The figures prove what had been suspected, that a relatively small group of employees is responsible for the majority of the injuries. Only 7.56% of employees were involved in 33.42%, or 1/3, of all accidents. About 15% of the employees caused 50% of all injuries. And 27%, or slightly over ¼ of the workers, had 71% of the accidents. These 27% had more than three injuries per person and surpassed, therefore, the over-all average of 2.84. Looking at these figures from the opposite viewpoint, 2,573 employees, or 49.4%, had only 9% of the accidents.

Because there are no similar statistics available a comparison with other industries cannot be made. However, the estimates reported from some industries seem to be too high.

In order to obtain a clearer picture of the distribution of these 14,825 accidents in the plant, the frequency of accidents in individual departments was determined. As in every industrial organization, the activities of this plant are divided into the productive and service departments, the productive departments forming the front line and the service departments comprising all activities to make possible smooth and uninterrupted operations. The first four items in Table I show the accident frequency of the production departments. Two of these departments (1 and 2) handle steel products, the next two (3 and 4), almost exclusively, produce the inner trim of cars and handle materials of different kinds, but very little steel.

Together these four departments employed 2,943 workers, or 56.5% of the total, and had 7,899 accidents, or 53.2% of all accidents.

All other departments, or 43.5% of the workers, had 46.8% of the accidents. These latter service departments include such activities as maintenance, shipping, material handling, tool and die and similar services. The majority of these jobs is performed by skilled workers, many of whom are journeymen.

The two highest accident figures, in departments 1 and 10, as well as the lowest figures in departments 3 and 8, are equally divided between production and service departments.

The figures indicate that the accident frequency is about the same in the production and the service departments. It is, indeed, slightly higher in the service departments.

The more hazardous work of handling sheet metal before or after manufacturing, with the possibilities of numerous lacerations, is shown clearly in the high frequency of department 1 where the steel is manufactured, and department 10 where manufactured parts are loaded into box-cars for shipping. The low production department 3 has, exclusively, women working on sewing machines and benches with practically no hazards at all. Department 8, the lowest one of the service departments, includes checkers and inspectors.

Tiffin, in his "Industrial Psychology," discusses the relationship between production and safety. He quotes a study undertaken by the American Engineering Council in 1928. On a country-wide basis and over a period of years, this study pointed out the surprising fact that increased production in nearly every industry was accompanied by a decrease in the accident rate.

In the plant where this examination was made, all production work is on an incentive basis. The workers are paid a guaranteed rate, and everything produced above this rate is paid on a premium basis. Therefore the faster and more the production, the higher the earnings.

The service departments are paid on a straight day-rate basis. Our figures indicate that there is no difference in accident frequency caused by these different modes of work. From personal observations over a long period, there can, however, be no doubt that increased production definitely decreases the accident rate. On numerous occasions a comparison of the production figures per day with the number of hospital visits for injuries on the same day has shown this fact: high production, low accident figures, and vice versa.

There are other factors to be considered which have a definite relationship to the increase or decrease of accident rates. The time of the acci-

TABLE I.
ACCIDENT STUDY BY DEPARTMENTS

Department	No. of Employees 1948	No. of Accidents 1948	Man Hours Worked 1948	How Frequently Did Accidents Occur	Number per Million Man Hrs.
1. Press-room	1,214	4,431	1,474,238	every 332.7 man hrs.	3,000
2. Metal-assembly	729	2,696	1,287,607	" 447.6 " "	2,090
3. Trim—Cut & Sew (Women)	723	560	661,354	" 1,181.0 " "	840
4. Trim—Cut & Sew (Men)	277	308	221,102	" 717.9 " "	1,300
5. Welder Maintenance	96	467	170,671	" 365.4 " "	2,730
6. Garage & Yard Salvage	10	36	12,569	" 349.0 " "	2,800
7. Maintenance	420	1,251	751,007	" 600.3 " "	1,660
8. Production Scheduling	98	91	140,222	" 1,540.0 " "	650
9. Material Control	140	217	119,983	" 552.9 " "	1,800
10. Shipping and Receiving	487	1,727	584,911	" 338.0 " "	2,970
11. Material Handling	341	693	389,124	" 561.0 " "	1,780
12. Tool & Die	673	2,348	1,324,793	" 572.0 " "	1,770
	5,208	14,825	7,365,444	490.6	2,000

TABLE II.
ACCIDENT FIGURES BY MONTH IN 1948

Month	New Accidents	Man Hours Worked
January	1,036	600.160
February	954	552.495
March	1,272	646.201
April	1,095	558.854
May	1,140	580.803
June	1,311	567.802
July	1,527	607.594
August	1,602	629.156
September	1,343	644.743
October	1,338	720.941
November	1,266	690.720
December	941	565.987
	14,825	73,654,54

dents was checked throughout the entire year. With most operations on an eight-hour schedule, interrupted by a half-hour rest period after four hours and two 10-minute rest periods after two and six hours, the factor of fatigue was not apparent. The accidents happened on an equal basis throughout the working hours. There was a slight increase at the beginning of the shift and after the half-hour rest period. There is, however, little doubt that working these same operations 10 to 12 hours would increase the rate at the end of the shift as shown by Vernon.[5]

Looking at the figures throughout the five-day working week, there was a slight increase on Monday and Friday. On six-day operations Saturday was also slightly higher.

In viewing the figures month by month as shown in Table II, there is a definite increase in the accident rate during July and August, the only really hot months in this climate. This increase amounts to about 25%. Osborn and Vernon[6] reported the influence of heat and cold on the accident rate in 1922. The optimum temperature, they found, deviated very little from 70°. Excessive humidity and sudden so-called frontal changes of the weather have, in our experience, also a definite influence in increasing the number of accidents.

Because of the large number of accidents involved in this examination an arbitrary line had to be drawn somewhere in order to select a practical number of persons for further analysis, who had suffered accidents more frequently than the average. Arbitrarily, this number was set at 10 accidents and more per year. This figure is more than three times the over-all average of 2.84.

It was found that 297 employees, or 5.7%, had 10 or more injuries. They had a total of 4,099, or 27.65% of all injuries. Fig. 3 shows the number of individual injuries in these accident-frequent workers, which goes up to 32 injuries per year in one case. One hundred workers, or 1.9%, had more than 15 accidents; they had 1,835, or 12.4% of all accidents.

Table III gives the distribution of these 297 accident-frequent workers in the different de-

TABLE III.
DISTRIBUTION OF "ACCIDENT-PRONE" EMPLOYEES IN DIFFERENT DEPARTMENTS

Department	Total Number of Employees	Number of Accident-Prone	% of Employees
1. Press-room	1,214	102	8.4
2. Metal-assembly	729	37	5.0
3. Trim—Cut and Sew (women)	723	2	0.27
4. Trim—Cut and Sew (men)	277	2	0.72
5. Welder Maintenance	96	15	15.6
6. Garage and Yard Salvage	10	2	20.0
7. Maintenance	420	23	5.5
8. Production Scheduling	98	1	1.0
9. Material Control	140	1	0.7
10. Shipping and Receiving	487	45	9.2
11. Material Handling	341	6	1.4
12. Tool and Die	673	61	9.06

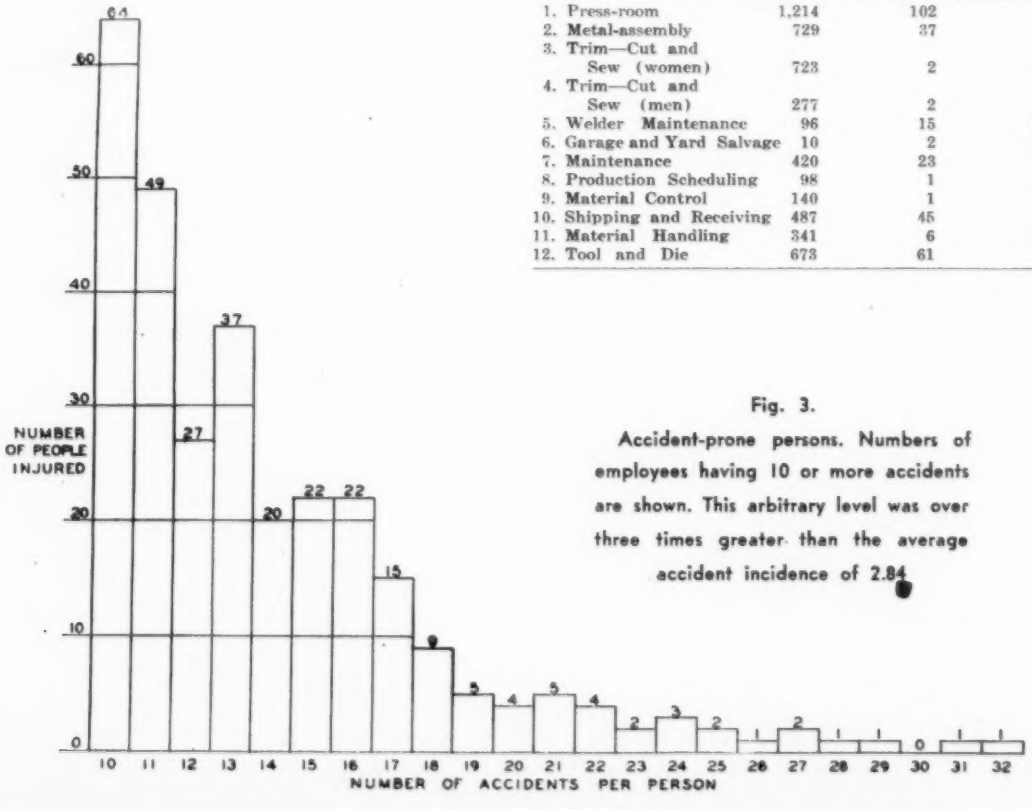

Fig. 3.

Accident-prone persons. Numbers of employees having 10 or more accidents are shown. This arbitrary level was over three times greater than the average accident incidence of 2.84.

partments. The surprising factor one learns from this table is the preponderance of the accident-prone workers in the service departments. One hundred and forty-three, or 48%, of the workers with 10 or more accidents worked in production departments, where 56.5% of the total manpower of the plant is employed; 153, or 52%, worked in service departments with only 43.5 of the total manpower. These figures indicate that accident-prone people will get hurt irrespective of the specific hazards of the job. To exemplify that further, two of the departments will be compared. Department 1, called the press room, handling exclusively sheet metal, which is processed in more than 350 punch presses of different size and design, has by far the most hazardous operations, while department 5, the welder maintenance department, repairs and maintains electric and other welding machines. This department employs only skilled workers, most of them electricians, while department 1 has practically no skilled workers, and yet the number of accident-frequent people in department 5 was almost double the one in department 1 percentage-wise. The low figure in department 3 is explained by the almost complete absence of any hazards. The high percentage in department 12, tool and die, with exclusively skilled employees working without any pressure and speed is remarkable.

The age of the 297 accident-frequent employees is shown in Fig. 4. One hundred and eighty-six, or 63%, are under the age of 30; 264, or 88%, are less than 50 years of age; and only five, or 1.6%, are over 60 years. These figures indicate that the accident rate drops constantly with age. The same observation has been reported by Hewes,[7] Gates[8] and others, while Stevens[9] reported a higher accident rate among older workers. Individual factors in different industries are probably responsible for this discrepancy. In our experience, the younger worker is definitely the less safe worker. This fact cannot be explained alone by the tendency to give

TABLE IV.
SENIORITY AGE OF ACCIDENT-FREQUENT EMPLOYEES

Years of Service	Number	%
Less than 1	110	36.8
1 — 2	72	24.2
3 — 5	43	14.5
6 — 10	12	4.0
11 — 20	34	11.4
over 20	27	9.1

the younger workers the more difficult and hazardous jobs. The average age of our skilled workers, for instance, is high, and under the same working conditions the youngest ones show the highest rate. The worker with 31 injuries, the second highest rate in the entire plant, is a toolmaker under 30.

In this relationship of age and accident-frequency, certainly the length of service and experience have to be considered. While on the one side the inexperienced worker, not familiar with all possible hazards, seems to be more exposed to accidents, the argument that the older worker performing a routine job over a long period of time becomes less concentrated and more careless has been raised on the other side.

The service age of the 297 workers under scrutiny is shown in Table IV. One hundred and ten, or 36.8%, have one year or less service; 179, or 61%, have two years or less; 222, or 74%, less than five years. These figures indicate that longer experience and length of service decrease the accident rate. One observation should be mentioned here, the accident rate of workers who constantly are shifted around from job to job is much higher than that of others always on the same operation over a long period.

Of the 297 employees, 151 worked first shift, 131, second shift, 15, third shift. There seems to be a slight increase on second shift considering the man hours worked, but there is no definite trend apparent.

To gain further knowledge of the mental and emotional status of these accident-frequent employees, all records available on each individual

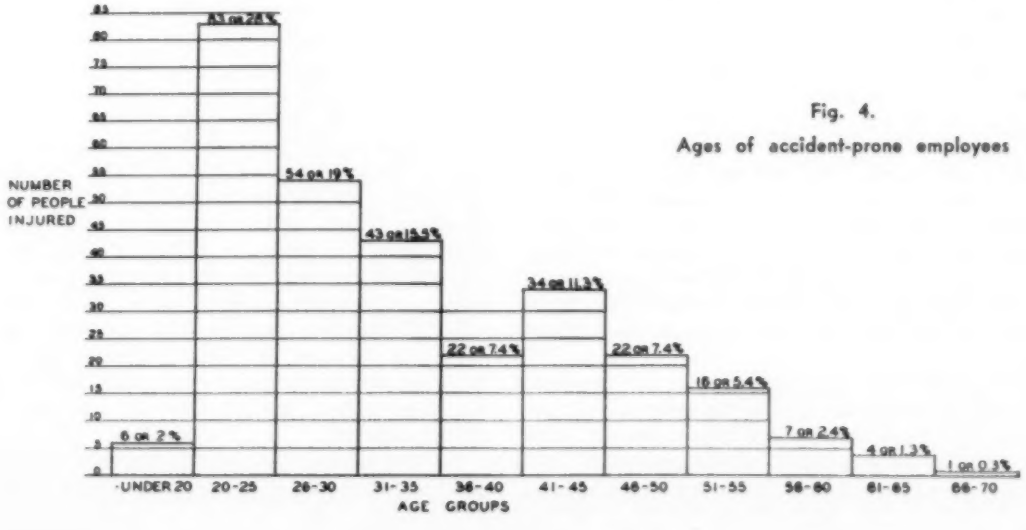

Fig. 4.
Ages of accident-prone employees

case were examined. This indirect way was chosen because we felt that direct questioning and more or less complicated psychological tests were not practical. Fear of losing the job and of discrimination would probably render such direct contact in many instances worthless. Many observations were made during the frequent visits of these men to the plant dispensary.

In attempting to evaluate personality traits in connection with accident proneness one has to consider on the one side the personality as a whole, the life-long mental and emotional pattern, inherited or acquired, making up the individual, and on the other side the immediate mental and emotional status at the time of the accident. Dunbar,[10] Moorad,[1] Wong and Hobbs,[11] Sutter,[12] and others, in recent studies come to the conclusion that accident proneness is almost exclusively the result of personality traits which were acquired from early youth. An insecure childhood through death or separation of the parents was found in a high percentage of these accident-frequent individuals.

Fulton stated in a recent article that 30% of the people in an industrial organization are responsible for 80 to 85% of the visits to the dispensaries for sickness and injury. He said that he found in this group the neurotics, the indigents, the accident-prone, and other "below-par" people. He pointed out that, with exceptions, most of these people are not different in their physical set-up from the over-all average of a plant population, but that because of their mental and emotional instability they are the problems of every organization.

Of the 297 accident-prone workers under examination, 193, or 64.6%, showed definite evidence of unstable personalities. There are several well distinguished groups united under the heading of instability. By far the largest group is composed of those who practically never grew beyond the school age mentally and/or emotionally. They work without much enthusiasm, are often tardy for work, quit five minutes before everyone else, and complain about the "heavy job." They show little sense of responsibility to their family, the company, society as a whole, or anyone else. In their teen-age mentality they remain away from work (play hooky) and use any kind of excuse to cover their absenteeism. They usually know everything better, and sneer at safety rules and suggestions, but when they get hurt they shout about the unsafe working conditions. Some in this group are just mentally retarded, are very friendly and willing workers, but lack the mental capacity to use good judgment in dealing with safety hazards, or their reaction is very slow in case of an arising emergency.

Another well-defined group among the unstable employees is that of the neurotics and hypochondriacs. They are maladjusted people with imagined or exaggerated minor physical ills, always under tension, and often frustrated. They are usually poor workers and therefore get in conflict with supervision. In their constant struggle to keep up with the required production they have a tendency to more frequent accidents. They are well known in every industrial medical department.

TABLE V.
TABULATION OF FACTORS EXTRACTED FROM PERSONNEL AND OTHER RECORDS OF ACCIDENT-FREQUENT EMPLOYEES

	Number	%
1. Unstable personalities		
2. Marked absenteeism	129	43.4
3. Quits (since examination started)	33	11.1
4. Defective vision (not corrected)	7	2.4
5. Organic diseases	13	4.4
6. Reprimands for violation of plant rules	48	16.1
7. Reprimands for violation of safety rules	19	6.4
8. Marital status		
a. Married	190	65.5
b. Single	87	
c. Divorced or separated	12	35.5
d. Widower	5	
e. Unknown	3	

Only a few of the 297 had any physical defects or conditions which could have contributed to their accident frequency. Faulty vision was found in only seven employees, and the number with other physical disabilities was also low. Thirteen were ailing with cardiovascular-renal conditions, chronic arthritis, diabetes, and other diseases which may have increased their accident rate. A few are known to be chronic alcoholics.

In Table V some of the more important factors extracted from the different records are summarized. The high absenteeism in 43.4% of these people is not surprising, considering the high percentage of unstable personalities reported in line 1. The number of quits is much higher than the plant average.

In looking over the work records, the interesting fact was noted that some of the best workers, especially in the skilled group, are found to be accident-prone. Some of these probably are sacrificing safety in order further to improve the quantity of their work. Several in this group are known to have difficult domestic problems. They bring their worries to the job, their minds wander homeward to a sick wife or child, and the lack of concentration brings on the injury. A typical case is that of a usually stable and excellent worker whose wife is suffering with generalized carcinomatosis. Working in a job without any hazards he gets hurt constantly. Many other examples could be given here from the group of 297 in which temporary conditions caused severe anxieties and worries, and increased the accident rates. Such conditions can be insecure family life, sickness, housing, financial, or sex problems. There also can be worries about the job, and other conditions inside the plant, giving the worker the feeling of insecurity.

In this connection it is interesting to scan the marital status of the accident-frequent workers.

In Table V (line 8), 104, or 35.5%, are either single, divorced or widower. This figure is remarkable because the over-all average of all workers in the plant shows about 90% married; in other words, 3½ times as many people are unmarried among the accident-prone as in the plant as a whole. The question arises: are they not married because they are unstable personalities, or is their instability the result of the lack of an orderly family life? Many of these workers are known to live in rooming houses, eat irregularly, and visit their rooms only to sleep. They are certainly much more exposed to the temptations of a large city than married men. The number of sub-clinical avitaminoses is very high in these men, and many lack proper sleep, while others are addicted to alcoholism. It is not surprising that the accident rate in this group is high.

SO FAR, this examination has shown the extent of accident frequency in a stamping plant, and an attempt has been made to discuss a series of factors which is believed either to cause accident proneness or to contribute to it. The question arising now is: what steps can we take or should we take to prevent our employees from getting injured because of their own inadequacy? Is it purely a psychiatric problem, as many claim, or can the industrial physician do his share about it? Whatever the answer will be, and there must be an answer, it will be a difficult, complex, and delicate problem to solve.

The first approach to it in our opinion should lead to a more careful selection of the right employee for the right job. In the past we have concentrated our attention on the physical status of the applicant for hire. The history we take concerns his previous physical condition, rarely his mental and emotional past. A good interviewer in the employment office, with years of experience, probably screens out the most obvious cases of instability, but his efforts are limited. Much has been written about psychological testing of employees at the time they apply for a job, and many such tests have been developed in recent years. Most are too complicated for use in large industrial plants. However, a short simple test every literate worker can take should be developed and made part of the hiring procedure to give information more important than the carefully noted width of the inguinal canal. The test should be evaluated by specially trained persons whose responsibilities it would be to screen out the cases of extreme instability and immaturity, and to direct the employee with mere trends of such into the proper jobs. Such testing would not only benefit the employer, but would be to the advantage of the employee whose health and future would be better safeguarded. There is no doubt that many accident-prone people could be channeled into jobs where hazards are at a minimum.

When examining the prospective employees, the industrial physician often discovers many scars from previous injuries. They may be silent testimonies of an accident-prone personality and should, if verified, influence placement.

The task of decreasing accident frequency becomes more complicated when considering the steps to be taken in the established plant population. Only intelligent and close cooperation among all departments involved and the employee himself can lead to a result.

The following procedure was worked out in our plant between the medical and safety departments, and tried throughout 1949. All new industrial accidents reported to the hospital were listed and sent to the safety department the next morning, and there were transferred to a specially-developed file card. These file cards were kept according to department, and stickers of different colors indicated the number of accidents. By this arrangement the safety department was able to maintain a close watch on each employee. If the number of accidents per unit of time went unusually high, a careful check-up of the job was done to eliminate possible mechanical causes. In many instances it was discovered that the men were careless or negligent with the supplied protective apparel. When it was apparent that the man, and not the job, was responsible for the accident frequency, a note would be sent to the foreman telling him the facts and asking him to talk with the man. It is obvious that the success or failure of this approach depends upon the proper contact the foreman makes with his accident-prone employee. From our experiences, it is important that the foreman is not only sold on this method, but also that he be taught to use the best psychological approach. In a few cases, the wrong words gave the employee the impression he was being reprimanded and there were minor repercussions. On the whole, there was no difficulty encountered, for the employee understood the problem, and often came to the medical department for advice.

This arrangement is on a tryout basis. It can easily be changed so that the contact with the accident-prone employee is made in the medical department, either by the medical staff or where available, by a trained social worker.

TABLE VI.
TOTAL INJURIES OF 264 EMPLOYEES WHO WORKED THROUGHOUT 1948 AND 1949

1948	3,597 Injuries	
1949	2,488 "	
Employees having:		
Fewer Injuries in 1949		181
More " "		50
Same " "		33
		264
Over 10 injuries		71
Over 15 injuries		23
Over 20 injuries		13
Over 25 injuries		3
Over 30 injuries		1
		111

A few final figures will show the result of this endeavor to decrease accident frequency among the known accident-prone (Table VI).

Of the 297 accident-prone workers with 10 and more injuries in 1948, 264 worked throughout 1949. These 264 had 3,597 injuries in 1948 and 2,488 in 1949, or a reduction of 31%. One hundred and eighty-one, or 68%, had fewer injuries than the year before. Fifty, or 19%, had more, and the remaining 33 had the same number. Of the 264, only 111, or 41%, again had 10 or more injuries. All of these 264 workers had been informed about their accident record, and had been watched that they reported to the dispensary every time they were injured. Close supervision of these men is imperative because they might try to hide minor injuries to improve their record. It is not the intention of this study to discourage any employee from coming to the medical department when injured, but to find new ways to prevent them from constantly getting hurt.

One definite advantage of this method in tracing accident-frequent people has been the factor that we were able to discover soon the accident-prones among the new hired workers. A comparison of their accident record with their absentee and working record revealed in many cases the unstable and immature personality.

One question remains to be answered. What can and what should we do with the definitely proved accident-prone people—in our case the 111 employees who had more than 10 injuries for the second year, and especially the 50 who had a worse record in 1949?

So far in this discussion any differentiation between minor and so-called lost-time accidents has been avoided. An accident is an accident, and whether time is lost depends upon the severity of the injury alone. All statistical evidence shows that people prone to frequent accidents will, early or late, receive severe and disabling injuries. Several of the 297 employees had lost-time accidents in the last two years or previous, and several had automobile accidents and other injuries outside the plant in recent months. It is to be expected that some of the accident-prone personnel will receive disabling injuries in the years to come. The proper placement of these individuals in jobs with the least hazardous operations is, therefore, an essential part of a good accident prevention program. In many cases, such a transfer will decrease the number of accidents, as has been proved by comparing the records of both years.

However, in a small percentage of people all these measures are of no avail. They still get injured. The young toolmaker mentioned above who was second highest in number of accidents in 1948 with 31 injuries, was leading the list with 36 in 1949. Sixteen others had more than 20 accidents again. These persons are the ones Csillag and Hedri[13] describe in their recent paper. Through some experience in their past, they have become mentally ill, and the subconscious motive of their accidents is aggression turned against themselves. They are a safety liability wherever they are, in the plant, at home, or on the road. The best advice we can give these persons is to see a psychiatrist.

Any accident prevention program, whatever approach it is going to use, has to be in the main an educational program. Our experiences during this two-year examination have given us ample proof for this statement. Most people still have the fatalistic attitude that accidents happen by chance and are due to bad luck. They will ask more or less embarrassing questions about the etiology of every little ailment they develop, but they will never ask why they get injured so much more often than their neighbor doing the same type of work. This is understandable when we consider that our own experiences with this intricate problem of accident proneness are of rather recent date. To bring out all factors which contribute to or cause accident frequency, studies comparable to this will be necessary in many other industries. Based on this knowledge a program can be developed to reduce the accident toll caused by human insufficiencies. Such a program should become part of the general health maintenance plan of every efficient industrial medical department. In the meantime, closest cooperation between the medical and safety departments can do much to lower the accident rate caused by human failure and so safeguard the life and health of our plant population.

[MR. EARL STOVER, Safety Director of Fisher Body Division, Cleveland, gave invaluable assistance during this investigation. Without his cooperation this examination would not have been possible.]

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Adaptation of Intravenous Procaine to Industrial Medicine

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EVER since 1935 when Leriche and Fontaine[1] injected procaine hydrochloride into the veins of patients, the intravenous use of this substance has found wide-spread acceptance in the relief of pain, both somatic and sympathetic in origin. The dose recommended by Graubard[2] and his co-workers is 4 mg. of a 0.1% solution of procaine per kg. of body weight given in 20 minutes. In an effort to adapt this treatment for use in industrial medicine, various solutions of procaine were tested in our clinic with the objective of obtaining optimum benefit in the minimum amount of time.

At first, a series of 50 patients was treated using the full procaine unit as advocated by Graubard. It was noted that relief from the usual industrial injuries occurred when the patient received as little as one-quarter to one-half of the entire dose. A second series of 150 patients was then treated by giving 10 cc. of the 1% commercial preparation intravenously. The advantages of this method were two-fold, namely, the drug could be given with an ordinary syringe, and the time required for administration was reduced to five minutes. Although the actual amount of procaine in this series of patients was only approximately 1/3 of the amount in the full procaine unit, the relief obtained compared favorably to that in the first series. The disadvantage of this method was the increase in the number of undesired side reactions. It was noted further that the relief obtained after injecting the first 5 cc. to 7 cc. of 1% procaine was not augmented appreciably by the remainder of the injection. Therefore, a third series consisting of more than 700 patients was tested using only 6 cc. of 1% solution administered in the course of two minutes. The number and intensity of side reactions was greatly reduced. Relief was not appreciably altered, but the duration of effect was diminished to some extent.

Mode of Action of Intravenous Procaine

IN THE blood stream procaine rapidly is broken down by plasma enzymes into di-ethyl-amino ethanol and para-aminobenzoic acid. The former is probably the effective substance responsible for inhibition of nerve impulse mediation at synaptic junctions especially in those cases of trauma which are accompanied by the classical symptoms of pain, redness, swelling, and loss of function. The effect of procaine is evidenced by the alleviation of symptoms. In these cases the symptoms are caused by spastic diatation of the precapillary arterioles. When procaine is given intravenously shortly after the occurence of the trauma, the effects are remarkable.

Types of Cases Treated

EVERY type of case—both occupational and non-occupational in origin—which was available in the clinic was treated with procaine to determine the efficacy of this drug. The anatomical distribution of the various injuries and ailments was widespread. For the purpose of this paper only a brief discussion of the outstanding cases will be presented. However, the charts are complete for the entire series. In a special study of 376 occupational ailments (these are included but not segregated in the chart) 40% had complete relief; 45% had adequate relief, no work restrictions; and 15% had adequate relief with some work restrictions.

Trauma

THESE cases of trauma make up by far the largest part of the cases. All parts of the anatomy were represented. In order of percentages, injuries of the upper extremities were first, followed by injuries of the lower extremities, chest, abdomen, back, head, neck, and groin. The anatomical location of the injury had no appreciable effect upon the results obtained, although in all cases the procaine was administered either in the antecubital or dorsal veins of the hands. The injuries treated consisted of contusions, sprains, strains, swelling, paresthesias and fractures. In all these cases, the results achieved warranted the use of procaine. The duration of effect was from two to eight hours. In only 15% of the cases treated was it necessary to assign the employee a change of job. Eighty-five percent of employees treated were able to return to their original work. In none of the cases treated was it necessary to send the patient home. Sixty-two percent of the series required additional injections of procaine—some even on the same day.

Dermatitis

SKIN conditions consisting of burning and itching, and skin lesions caused by the various solvents utilized in the plant were treated with good results especially in so far as the alleviation of the pruritis and swelling was concerned. Recovery in all patients was accelerated. Skin re-

For the information of those not familiar with the General Motors Medical Organization, it should be pointed out that this medical research problem is one which appealed to the author particularly and is not a method of treatment used in all General Motors Divisions.

actions to drugs such as penicillin were improved considerably with daily or twice daily injections of procaine. Various food and plant allergies manifested by skin lesions, also responded favorably to this treatment.

Lead Poisoning

THREE patients with plumbism, with symptoms of abdominal distress, were treated with marked improvement in the symptoms even after calcium gluconate had failed, so that these employees were able to continue working.

Miscellaneous

DURING the recent epidemic of the so-called virus X in Delaware and Pennsylvania, the absentee rate at our plant was kept down to less than 6% as compared to the normal 2 to 3%, whereas the various institutions in the vicinity suffered a greatly increased absenteeism. In part, the reason for this low absentee rate was due to the fact that at the slightest symptom of the infection, such as nausea, vomiting, diarrhea, fever, abdominal or urinary distress, chest pain, or headache, the employees were advised to report to the clinic immediately where intravenous procaine was administered with gratifying relief, as well as with consequent abortion of the disabling effects of the illness. As many as 20 patients were treated daily for this infection during the height of the epidemic.

The effect of intravenous procaine therapy on acute sinusitis was shown to be beneficial in about 60% of the cases treated by this method. Swelling of the nasal mucosa and headache were promptly relieved. Drainage was re-established with resultant recovery. One patient presented a peculiar complication of sinusitis in that the internal oblique muscle of the right eye had become involved to such an extent that the diplopia resulted. After injecting intravenous procaine the diplopia disappeared for three hours. Therefore, the patient was given a series of injections every four hours for three days, and recovery was complete and uneventful.

As an aid in differential diagnosis, intravenous procaine has been used previously by Graubard to differentiate cases of herniated intervertebral disc from other sources of back pain. Control of pain in trauma was uniformally good except in cases of herniated disc. In our clinic, it was noted that pain resulting from a diseased appendix would not be relieved by intravenous procaine in the doses given, whereby all other types of pain in that region obtained some degree of relief. As a result, three cases of questionable appendicitis were tested with intravenous procaine without any resulting relief. At the hospital, exploration revealed definite appendicitis.

	MYOPATHY					NEUROPATHY					OSTEO-INVOLVEMENT					ARTHROPATHY					VISCERAL					DERMATITIS					ALL CASES				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	T
SERIES I:																																				
Head & Face	1				2					1																			1		1			1	3	5
Neck				1	1					2																								1	3	4
Thorax				1	1																				2									1	3	4
Upper Extremity			2		1				2	2								2											1			2	4	4	10
Wrists & Hands	1	1						1		2								1	1											1	1	1	1	3	7
Abdomen			1		2																			2								1	2	2	5
Back			2	1	3																											2	1	3	6
Groin & Genitals																																				0
Lower Extremities					1					1																								2	2
Feet			1		2														2													1		4	5
Generalized																													1	1				1	1	2
Total	2	1	6	3	13	0	0	1	2	8	0	0	0	0	0	0	0	0	3	3	0	0	0	2	2	0	0	0	2	2	2	1	7	12	28	50
SERIES II:																																				
Head & Face				3			1		2				2																			1	5	2	8
Neck			1	2	2				1	1			1				1		1												1	1	5	3	10
Thorax	2		3	2	5				2	1														2							2	3	6	6	17
Upper Extremity	1	4	8	11	17		1	6	5	12			2	1			1	2	1	3								4	2	5	1	6	22	20	37	86
Wrists & Hands		1		2									1	1														1	2	3		1	2	5	3	11
Abdomen			1	1	1																		1	2	1							2	3	2	7
Back		1	2	1	2																											1	2	1	2	6
Groin & Genitals																													1					1		1
Lower Extremities				1																														1		1
Feet			1	1																												1	1		2
Generalized																													1					1		1
Total	3	6	16	24	27	0	1	7	8	16	0	0	3	5	0	0	2	2	2	3	0	0	1	4	1	0	0	5	6	8	3	9	34	49	55	150
SERIES III:																																				
Head & Face			4	2	6			3	4	1				3	1			1		1									2			8	11	9	28
Neck		1	1	1	3					2									2	1											1	1	3	6	11
Thorax	1	4	9	22	21																2	2	1	6	3						3	6	10	28	24	71
Upper Extremity		2	8	6	28		1	4	10	18			2	4			2	1	1	2									2	1		5	15	23	49	92
Wrists & Hands	1	5	7	8	16	2	3	9	4	12	1	1	1	2	1		2	2	1	2											1	2	2	4	4	12	21	17	35	89
Abdomen	1	1	2	15	13	1		2	3	2											5	11	22	57	114		1	1	2	1	7	13	27	77	130	254
Back	2	1	3	11	12	2		2					1	1					1											1	4	1	6	13	13	37
Groin & Genitals			2	5	4																							1	2	1			3	7	5	15
Lower Extremities	1		2	5	15			1	2	4			2	1	1			2	1	3										1	1		7	9	25	42
Feet		1	1	3	4		1		2	2								2	2	1						1		1	3	1	1	2	4	10	8	25
General	4	1	2	6	5													6	4	5	4	6	6	9	7						8	9	14	19	17	67
Total	10	16	41	84	128	5	5	21	25	41	1	1	6	11	3	0	4	14	12	15	11	21	29	72	124	1	2	5	13	10	28	49	116	217	321	731
GRAND TOTAL	15	23	63	111	168	5	6	29	35	65	1	1	9	16	3	0	6	16	17	21	11	21	30	78	127	1	2	10	21	20	33	59	157	278	404	931

0—No relief, employee unable to continue working
1—Slight relief, but employee unable to work
2—Adequate relief, employee able to work with restrictions
3—Adequate relief, employee able to continue work without restrictions
4—Complete relief, employee able to continue work without restrictions

Method of Administering

THE patient was placed in bed and the antecubital veins were exposed. Six cubic centimeters of procaine 1% solution were drawn into an ordinary syringe and after the usual antiseptic preparation a venipuncture was made. The procaine was injected slowly during the course of two minutes. The syringe was withdrawn, and pressure was applied to the site of the puncture with sterile cotton and the patient was allowed to remain in bed for three to five minutes following the injection, so as to overcome any side effects due to the hypotensive action of procaine.

Side Effects

IN THE entire series of patients treated with procaine, only one manifested anything resembling the convulsive state which is the result of overdose of procaine. This patient received 15 cc. of 1% procaine and reacted with a tightness of the masseter and glutation muscles. He recovered full use of these muscles in about 15 minutes. The side effects most noticeable in about 50% of the patients were the sensation of flushing and light-headedness which were overcome in a few minutes. No allergic skin reactions to procaine were ever noticed, including those patients who were treated for penicillin-procaine reactions.

Contra-Indications

NO DEFINITE contra-indication due to the use of this drug was found. No procaine allergies were evident in the entire series, either with continuous or sporadic use. Theoretically, hypotension may be considered as a contra-indication, but if precautions are taken to keep the patient in bed for several minutes following the injections, as was done, no harmful effects are noted.

Summary

A METHOD for the use of procaine intravenously in industrial plants has been proposed. This method has the advantages of achieving results of more favorable and lasting types than those results following the usual course of physical therapy. The amount of time in the treatment of these cases has been reduced to a minimum of five to seven minutes. The effect of this type of treatment on the morale of the patients has considerably increased to an extent whereby they are physically and mentally capable of resuming their usual duties in the plant.

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Discussion

QUESTION: Was a control series run with those receiving injections of procaine?

ANSWER: In the beginning, a control series of 50 cases was run, using sterile saline. The controls definitely showed that procaine was effective.

QUESTION: What has been your experience with a patient's developing tolerance to procaine? Does this type of treatment meet with resistance? Do you get written permission to give it?

ANSWER: A number of people are procaine fast, and procaine had no effect on them. The intravenous injection showed no effect at all; no relief or any side effects, such as flushing or light-headedness.

As for written permission from employees to give procaine, I did not attempt to get this. I merely told each man that here was a substance that had been tried and tested before, and found to be beneficial, and would he be willing to take it? A number seemed reluctant because of sad experience with Army doctors and immunizations. On previous occasions injections had ended in muscular difficulty. They seemed to think that every needle had the same result. Also, there were histories of unpleasant experiences with technicians whose technique was poor in venipunctures. But only two did not let us inject the procaine. No one was so dissatisfied that he thought it was detrimental to his health.

QUESTION: What procedure is used, what brand, and how much is administered?

ANSWER: My procedure has been to have a bottle of 100 cc. 1% procaine, such as put out by the large pharmaceutical laboratories, and a supply of syringes and tourniquets available. The patient is allowed to lie down in bed, and 6 cc. of the procaine are withdrawn from the commercial preparation, using a syringe and preferably a needle of short length. Patients do not realize that it is the accuracy and skill of the doctor, not the length of the needle, which determines the degree of pain. The patient is then given the procaine slowly over the course of two minutes. This time can be shortened with certain patients, sometimes to as little as 30 seconds. There is no danger of untoward effects if the two-minute injection time is used.

After administration of the procaine, the needle is withdrawn, and the patient told that it is over. The patient should remain in bed three or four more minutes, and after-effects will be minimized by the time he is ready to go back to his job.

The age of the patient had very little to do with the effects of the procaine in so far as side effects or relief were concerned. This is true for all ages.

QUESTION: What has been your experience in the treatment of pains of internal origin?

ANSWER: I find that this method is most beneficial in those cases where one cannot get at the seat of the trouble, in contrast to cases of local pain. The blood stream will distribute the procaine to all parts of the body. However, if it is possible to get at the point with a local injection to block the trigger mechanism of the pain, the results are much more beneficial than from intravenous procaine.

QUESTION: For cases needing injection every four hours, what is the method you use in handling them away from work?

ANSWER: We handle those persons only at the plant. Patients who were at work at the plant were told that the procaine was only a relief procedure—not a cure, and that, should the pain recur, any of them could return to the medical department and have the treatment repeated.

QUESTION: What is the effect of procaine on dermatitis?

ANSWER: We treated almost all varieties of dermatitis seen in the plant. These included allergic states such as hives, penicillin reactions, etc., and dermatitis caused by contact with materials in the plant. By far, the most responsive to procaine were those of allergic origin. After one or two injections, the hives would disappear in a matter of minutes, with relief of pain and pruritus.

The cases of contact dermatitis were difficult to treat at first, in that we tried to keep the men working on the same job even though they continued to be exposed, but after treatment the swelling and discomfiture and stiffness of hands were to a great extent relieved. In later cases, we took the men off their jobs until relief was complete.

We have had no cases of procaine sensitivity.

Instruments and Devices

Displayed at General Motors Medical Conference

April 24, 1950

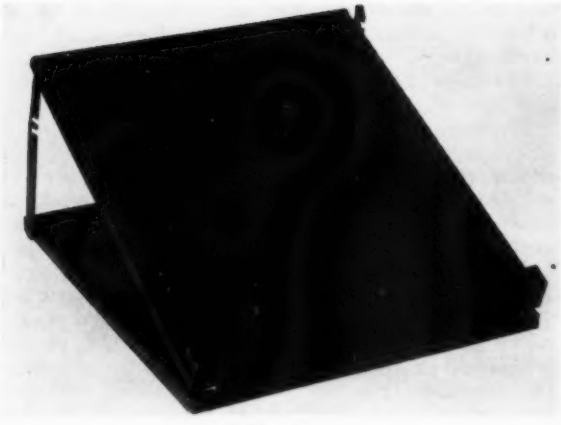


Fig. 1.
An inexpensive positioning board for x-ray of the mandible, adjustable to accord 13°, 15°, and 23°

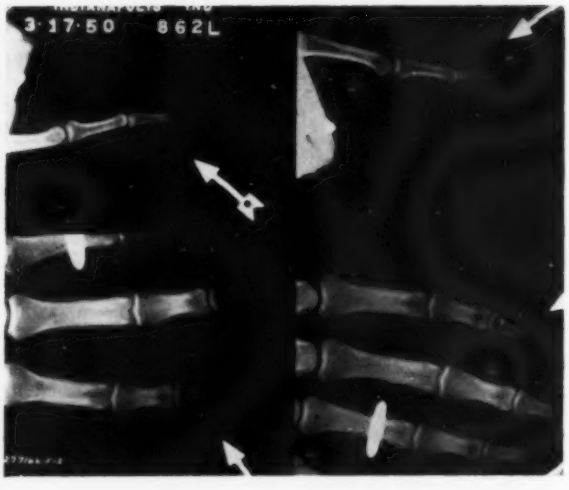


Fig. 2.
(a) Upper right: Indicators made of metal for placement on casette to point to portion of x-ray under observation. (b) Right: X-ray films showing how shadow of indicator appears on film
Devices in Figs. 1 and 2 were developed by Walter F. Hickman, M.D., Medical Director, Chevrolet-Indianapolis Division of General Motors Corporation

Fig. 3.
(a) Left: A simple and inexpensive method of converting any standard stretcher table into a highly satisfactory unit for hand and arm surgery. This detachable arm board consists of a slightly tapered board with two reversed hooks on the proximal end which fit into holes drilled in metal top of both sides of stretcher table. Stability of board is achieved by use of a hinged angle support with a metal plate that hooks on to the frame of the stretcher. Weight of the arm board assures stability of this attachment. To give height equal to the sponge rubber mattress on table, a small pad covered by rubber sheeting is placed on the arm board. This also adds to the patient's comfort. (b) Right: Arm board as it appears draped for actual usage. Developed by Preston N. Barton, M.D., Medical Director, New Departure Division of General Motors Corporation, Bristol, Connecticut

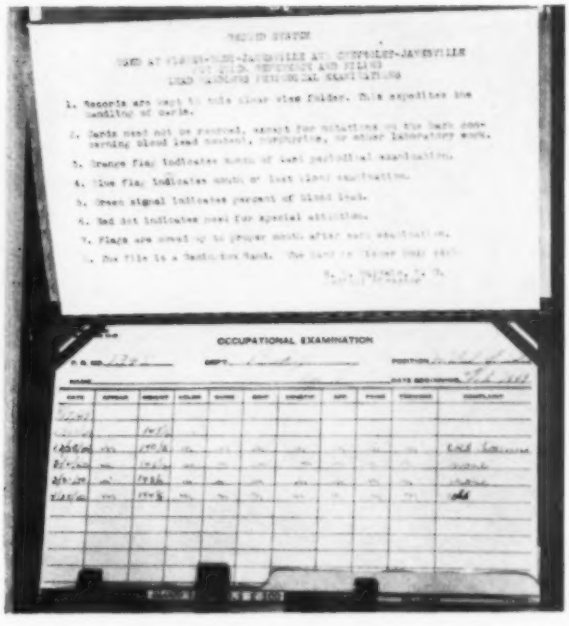


Fig. 4.

Occupational examination records of employees exposed to lead are mounted in a cardex file. (a) Above: Cards mounted in the file open and closed. (b) Right: Close-up of form used and the significance of dots and flags. (c) Below: Both sides of the examination form and markers, explaining the purpose of the various signals. Developed by Dr. R. M. Baldwin, Medical Director of the Fisher Body and Chevrolet Divisions, Janesville, Wisconsin

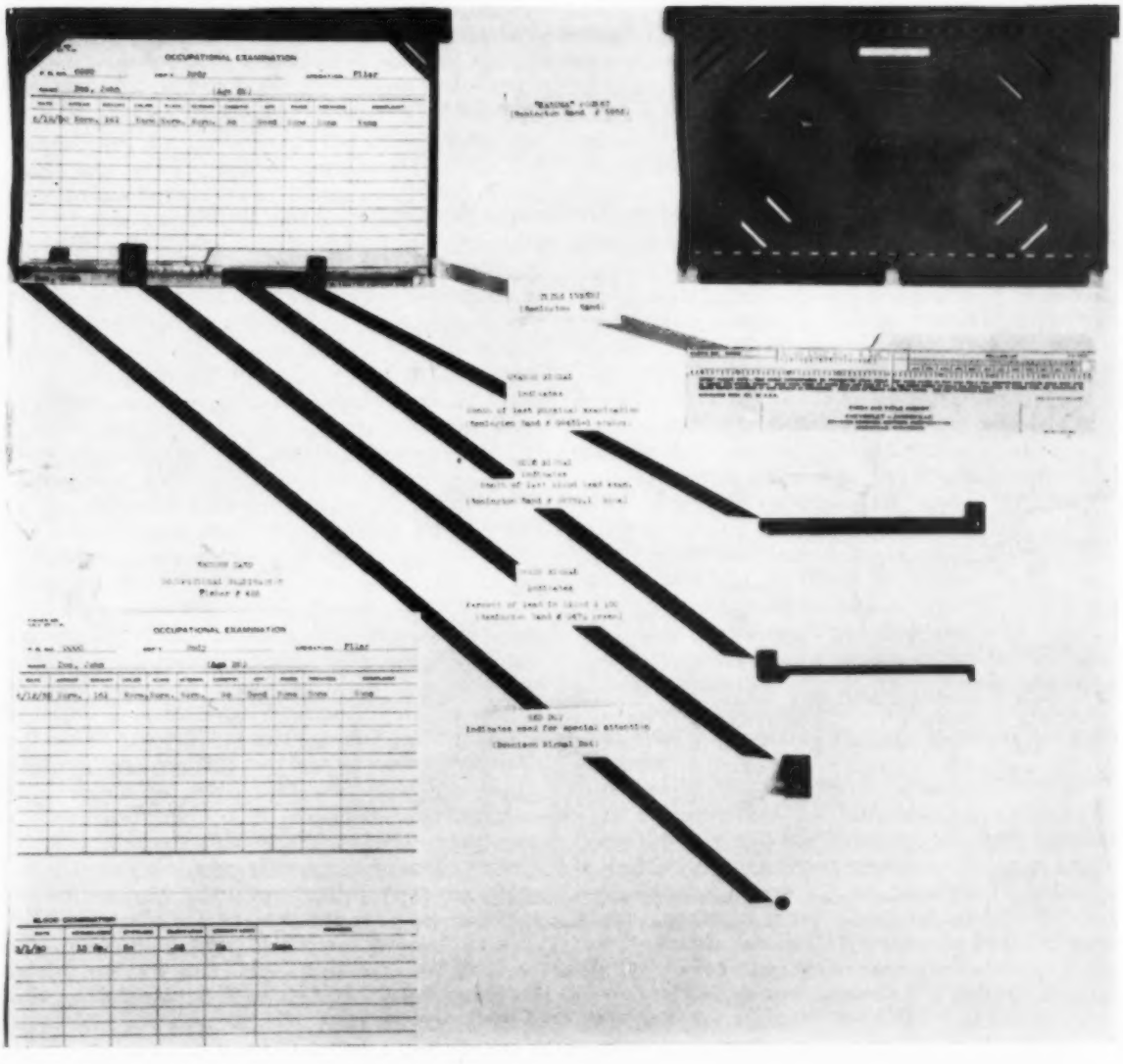


Fig. 5.

A simple method used to hasten the filling of whirlpool tubs. Filling whirlpool bath with its standard water jet type fixtures takes from one-half to three-quarters of an hour. Preston N. Barton, M.D., Medical Director, New Departure Division of General Motors Corporation, had a fixture installed permitting a hose connection which now fills the bath in approximately five minutes

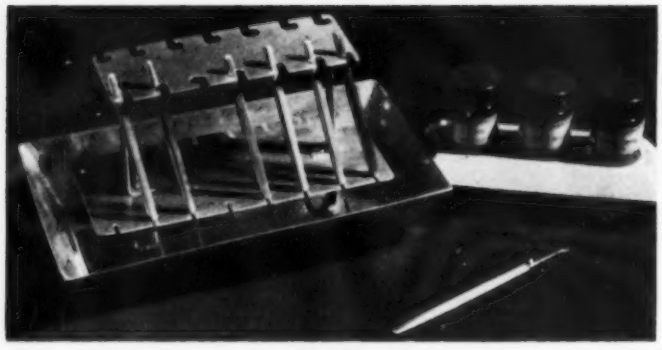
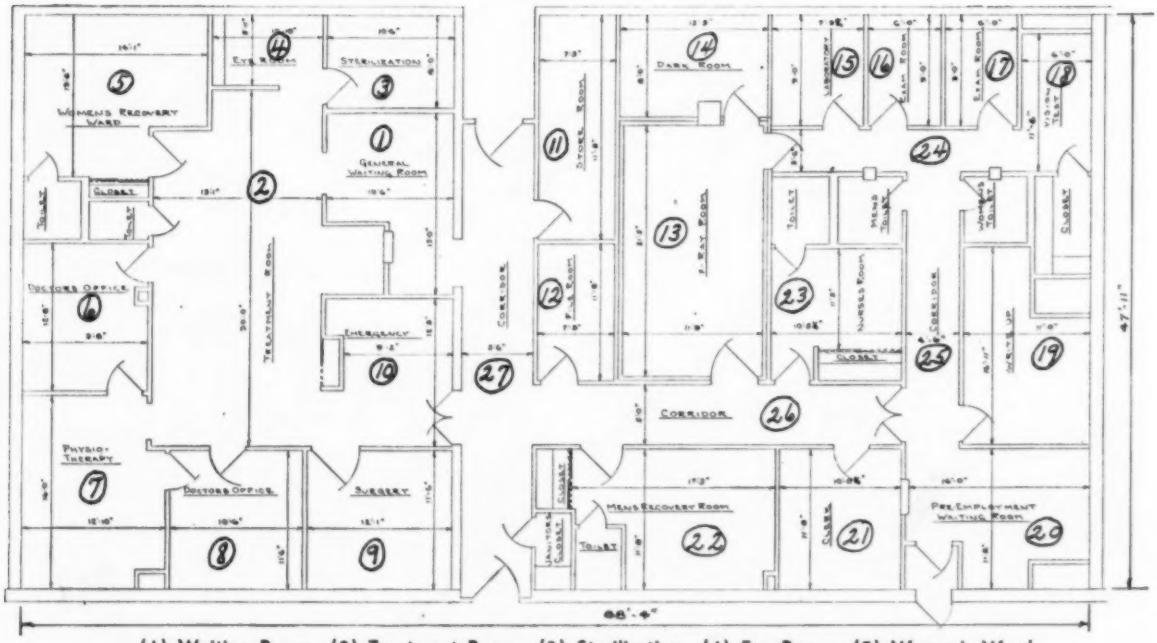


Fig. 6.

Sterilization rack for the cataract needles used for removing embedded foreign bodies from the eye. The rack is built in a rectangular pan approximately 1½ inches deep which is filled with zephiran chloride solution to one-fourth inch below the supporting rack. The rack, which is supplied with needles on one side only, is placed on top of the eye treatment cabinet where operator can reach both sides. When a needle is to be used, the operator first removes it from the rack (side A) and shakes it briskly to remove zephiran solution. He then rinses the tip of the needle in sterile water in bottle No. 1 and shakes it again. The needle is used on the patient, then rinsed in green soap solution in bottle No. 2. The operator shakes the needle again, then rinses it in sterile water in bottle No. 3. It is returned to the rack (side B), thus eliminating the possibility of using a needle before it has had adequate time in the zephiran solution. Solution in the pan may be changed daily, however, it should not be filled to a higher level than ¼ inch below the supporting rack because the zephiran solution will cause corrosion of the handles of the needles. Solution in the bottles should be changed daily. Developed by E. A. Irvin, M.D., Medical Director, Cadillac Motor Car Division, Detroit

Plan of Electro-Motive Division's Medical Department

— Plant No. 1 —



(1) Waiting Room. (2) Treatment Room. (3) Sterilization. (4) Eye Room. (5) Women's Ward. (6) Doctor's Office. (7) Physio-Therapy. (8) Doctor's Office. (9) Surgery. (10) Emergency Station. (11) Store Room. (12) Viewing and X-Ray File. (13) X-Ray Room. (14) Dark Room. (15) Laboratory. (16) Exam. Room. (17) Exam. Room. (18) Vision Test. (19) Write-up—Employment. (20) Waiting Room. (21) Clerk and Record. (22) Men's Ward. (23) Nurses' Room. (24) Corridor. (25) Corridor. (26) Corridor. (27) Corridor, Toilets and Closets. Over-all Space, 4224 Sq. Ft.

The Present Position and Future of British Industrial Medicine

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WITH the introduction of a State Medical Service into Great Britain in 1948, when over 90% of the medical profession entered into some form of state employment, the future of industrial medicine, one of the few branches of medical practice not absorbed into the national scheme, became the subject of much discussion and conjecture. To that small body of medical men engaged by private industry, it was at once obvious that the National Health Service Act, in dismissing occupational health in a few words, made no provision for industrial medical services for large sections of the working population. Indeed, with the exception of certain of the nationalized industries, together with a number of private undertakings maintaining medical services of their own, there exists no comprehensive form of industrial health service for this country at the present time. This state of affairs presents a curious anomaly which, in the opinion of many, cannot very well be allowed to remain in its present state.

On June 1, 1949, the Prime Minister announced to the House of Commons that the government had recently been considering the relationship between the National Health Service and the various health services at present provided in industry which make a call on medical manpower. He stated that, in order to secure that the country's limited medical resources were used to the best advantage and with due regard to economy, it was essential that these services should be organized in such a way as to insure that there would be no duplication or misdirection of effort. He had, therefore, appointed to advise the government on this matter, an Occupational Health Services Committee whose members were drawn from the industrial field, including both the management and trade union sides, and various branches of the medical profession. This committee, under the chairmanship of Judge E. T. Dale, had the following terms of reference: "To examine the relationship (including any possibility of overlapping) between the preventive and curative health services provided for the population at large and the industrial health services which make a call on medical manpower (doctors, nurses and auxiliary medical personnel); to consider what measures should be taken by the government and the other parties concerned to insure that such medical manpower is used to the best advantage; and to make recommendations." It was hoped that the Committee would not take long to complete its task and that with this end in view, it did not propose to survey the medical services of the Ministry of Pensions or that of the Ministry of Education. This committee is at present taking evidence from various sections of industry.

It would be of interest, therefore, to survey the position in regard to existing industrial health services in Great Britain, a country mustering a labor force of 18,000,000 "employed persons" widely distributed among some 243,796 factories. Of these, 200,000 employ less than 26 workers (Ministry of Labour, 1949), and in only 1.85% does there exist any form of medical service, although 40% of people working in British factories have some kind of medical supervision. More than half of these establishments employ less than 250 people and, in many, working conditions are far from satisfactory. Nevertheless, in view of the compulsory social insurance contributions paid by all employers in respect of each employee in order to finance, among other things, the National Health Service, it is unlikely that many of these small employers will provide a medical service of doctors or nurses at their own expense, even on a cooperative basis. Moreover, there are large sections of industry to which the Factories Acts do not apply, or to which certain sections only are applicable. These include mines, quarries, office and business houses, hotels and catering establishments, transport services, and the building and agricultural industries. For these, some sort of medical service would appear to be necessary if any comprehensive industrial health scheme is contemplated.

On the other hand, excellent medical services are available in the majority of larger industrial undertakings (about 3% in all), in general having the following objectives:

1. Health maintenance by the provision of a good working environment and through the medium of job selection.
2. Prevention of occupational disease and accidents while at work.
3. Organization and supervision of first treatment for the injured and sick while at work.
4. Rehabilitation and re-settlement of employees following injury or sickness, including permanent disability.
5. Health education of both workers and management.
6. Research and investigation.

It is important to point out, however, that there are only 239 full-time practitioners engaged in industry throughout the country as a whole, representing about 1% of the total number of general practitioners employed under the National Health Scheme. There are in addition some 2837 part-time doctors attached to factories, some in the capacity of Appointed Factory Doctors

combining this work with general practice and serving in the main the smaller plants. This suggests that only a small proportion of the larger factories have appointed their own medical officers and that a further extension of medical services by private enterprise can hardly be expected until more is known about the future of industrial medicine and its re-orientation in relation to the National Health Service. In this particular, it is of interest to note (Hansard, 1949) a statement from the Prime Minister that in view of a forthcoming inquiry into the relationship between the National Health Service and those at present provided in industry, substantial further development of industrial health services should as far as possible be postponed until the Advisory Committee's recommendations became available. Moreover, there is at the present time no coordination between these services and the National Health Service beyond that which can be secured through the personal efforts and initiative of the individual industrial physician with the support of his management.

Existing Government Medical Services in Industry

THE Factory Department of the Ministry of Labour and National Service is the oldest government department concerned with industrial health, and employs 15 whole-time medical inspectors of factories together with 400 lay inspectors. While they have contributed greatly to the advancement of industrial medicine, a medical staff of this size cannot seriously be said to provide adequate supervision for over a quarter of a million factories, and much of their time is taken up in the investigation of toxic hazards and in checking minimum standards of safety as laid down in the Factories Act. There are in addition some 1750 Appointed Factory Doctors (formerly styled Examining or Certifying Factory Surgeons), who are general practitioners appointed on a part-time basis under the Act. Their duties, however, are circumscribed and consist in the medical examination and annual re-examination of young persons engaged in industry and the periodic examination of those employed on certain dangerous processes. They also investigate and report on cases of industrial disease and are concerned with the certification of persons claiming benefit under the National Health (Industrial Injuries) Act which has now superseded the former Workmens' Compensation Act.

These duties, which were considered to need no special training, are confined to certain minimum statutory requirements and touch only a few aspects of occupational health.

The Nationalized Industries

AMONG the industries which have already been nationalized the Mines Medical Service, which comes under the Ministry of Fuel and Power, employs a small staff of central and regional medical officers who are concerned largely with applications for release from the industry on medical grounds and also with the prevention and treatment of injury or disease. Allied to this, the Silicosis and Asbestosis Medical Board employs 10 whole-time specialist physicians working on a regional basis for the examination and certification of people who develop industrial silicosis or asbestosis. A small number of collieries have whole-time or part-time doctors attached, but industrial nursing facilities are negligible and considerable expansion will be necessary if the needs of some 750,000 miners are to be adequately met. The Railway and Transport industries, now under government control, which employ over 800,000 people, provide a limited medical service which is being expanded although, in 1945, only 23 whole-time doctors were employed. Similarly, the General Post Office with 500,000 employees has a small central whole-time medical staff operating from the London Headquarters and dealing largely with sick absence, but, in addition, a general practitioner service is also available to the employees. The Ministry of Supply, which came into being as a wartime measure, has under its jurisdiction a number of factories with a complete and well-organized medical and nursing service. Docks and shipbuilding industries have a separate and somewhat patchy medical service provided either by private enterprise or under regulations made by the Board of Trade. The Ministry of National Insurance, now concerned with claims formerly dealt with under the Workmens' Compensation Act, have a whole-time and a part-time medical staff, the latter appointed on a sessional basis and recruited from the limited number of medical men with some knowledge of industrial injury or disease.

In general, however, the services existing outside factories are far from complete and there is a pressing need for coordination between privately-sponsored industrial medical services and the many government departments concerned. These include the Ministry of Health (National Health Service Act), the Ministry of Labour and National Service, the Ministry of National Insurance, the Ministry of Supply, the Ministry of Fuel and Power, the Transport Executive, the Board of Trade and the General Post Office. Unless this coordination can be achieved, overlapping will occur and local conditions will tend to remain chaotic and inefficient, while the industrial physician at the periphery, who is not a government employee, may well find himself in a somewhat bewildered position although free from central control.

Research and Post-Graduate Teaching

RESEARCH into occupational health, of greater importance today than ever before, requires to be integrated into any projected form of national scheme. At the present time much of this work is undertaken by the government-sponsored Industrial Health Research Board of the Medical

Research Council, often in affiliation with units established at universities and training schools. This work requires to be coordinated with that of the practicing industrial physician whether he be employed by a government department or working independently, and the interest and help of all employers should be actively enlisted to this end.

Occupational health is now regarded as a specialist branch of medicine and, as such, ought to be brought into line with the National Health Service. For those intending to make industrial medicine a career, a post-graduate Diploma in Industrial Health (D.I.H.) is now granted by four separate examining bodies and would appear to be a desirable, if not an essential, preliminary. Undergraduate courses and post-graduate courses for the Diploma in Public Health (D.P.H.) now include elementary lectures in occupational health, while whole-time courses for the D.I.H., extending over nine months and covering a comprehensive syllabus of instruction, are held at Manchester and Glasgow universities. The appointment of consultants in industrial health, at present under consideration, will probably depend upon post-graduate experience, both academic and in the field of practical industry, as well as upon higher qualifications.

Some Current Views

DURING the last five years a number of published reports and recommendations concerning the future of industrial medicine have appeared from different sections of the medical profession in Great Britain.

The report of the B.M.A. Committee on Industrial Health in Factories (1941) envisaged a nation-wide industrial health service, recognizing that occupational medicine is more or less detached from other medical services, owing mainly to unplanned development. They recommended a uniform procedure for the appointment of industrial doctors by an independent advisory body so as to avoid, on the one hand, the suspicion which may arise on the part of employees when the doctor is appointed solely by the employer for his own purpose, and, on the other, the sense of insecurity of the doctor who has no protection against inadequate remuneration or arbitrary dismissal. They recommended improved courses of training, both undergraduate and post-graduate for doctors in industry, and that industrial appointments should carry a uniform salaries scale, all appointments being interchangeable with a transferable pensions scheme.

At a conference on industrial health opened by Mr. Ernest Bevin when Minister of Labour in 1943, an Industrial Health Advisory Committee was launched, designed to secure for the government expert advice and suggestions for future action both during and after World War II with a view to the establishment of a National Health Scheme.

The Trades Union Congress (1944) submitted a memorandum to the Royal College of Physicians of London urging that occupational health should form part of the National Health Service, and that it should be a responsibility of the Ministry of Health. They expressed the view that the selection of industrial doctors should be by joint consultation between employers and employees under the egis of a government department.

In a memorandum on the same subject to the B.M.A., the Association of Industrial Medical Officers (1944), then numbering some 400 doctors engaged wholely or in a part-time capacity in industry, urged that a committee of inquiry should be set up by the government to consider the whole subject of industrial health, pointing out apparent defects in the existing system which provided a service for not more than 25% of employed persons. They felt that the training of medical and nursing personnel was inadequate, as were facilities for industrial research. The suggestion that the industrial physician may be professionally subservient to the employer who pays him was not a valid criticism, while the financial position or personal inclination of the employer may affect the quality, or lead to the termination, of the service without due regard to the worker.

The educational aspects of the problem were further dealt with by the Education Committee of the same Association (1945), who predicted an expanding demand for doctors and nurses in the field of industry. While deploring the scanty instruction in occupation medicine given to undergraduates, they stressed the importance of a closer link between consultants, hospital staffs and the industrial environment. In so far as post-graduate training was concerned, they advocated three distinct types of training: for industrial consultants, for whole-time industrial doctors and for part-time practitioners engaged in industry. In their view, the consultant in industrial health should possess a higher medical qualification and have held a university appointment, such as a fellowship, in addition to a wide clinical experience both academic and in the field of occupational health research. They pointed out that adequate remuneration, at present lacking, would be an essential inducement for the right type of man to undertake this work. Moreover, the whole-time industrial medical officer should have a special course of training, if necessary on a part-time basis, and the curriculum for this suggested course of study is now incorporated in that required for the Diploma in Industrial Health (D.I.H.). For part-time doctors, short special courses of study in selected subjects should be arranged at the University Department of Industrial Health and be held about twice a year. The adequate training of industrial nurses together with practical instruction and experience in industrial nursing was also stressed, although financial difficulties and

the present-day shortage of nurses with a good standard of general education would render this difficult of realization. It was recognized, however, that the Royal College of Nursing had done pioneer work in this field, having granted its own Certificate of Industrial Nursing since 1935.

The education of laymen such as personnel managers, hospital almoners and medical auxiliaries should be directed towards the importance of health maintenance and the prevention of accident and disease.

The Royal College of Physicians of London (1945) advocated a nation-wide industrial health service, urging that this should be planned in a bold manner as an integral part of the National Health Service and without regard to traditional arrangements. Such a service would be the responsibility of the Minister of Health and would be staffed in the main by part-time medical officers as well as by full-time industrial physicians who would have a panel of consultants in industrial health to advise them. The assistance of adequately trained non-medical personnel was also stressed and proposals for such training were indicated in the report. The essential feature of its administration should be close association everywhere with the body responsible for the peripheral administration of the National Health Service and with University Departments of Industrial Health where such exist. Clinical facilities, including beds for consultants and research workers in occupational disease should be provided and every encouragement given to research, both administratively and by industry itself. Remuneration, terms of service, promotion and pensions should be nationally established by negotiation, the cost being shared on a 50% basis between industry and the government. Joint consultation would insure cooperation between worker and management in matters of health. The appointment of medical officers might be left in the hands of the employer, subject to the approval of the Local Health Service Committee of the National Health Service, the membership of which would include representatives from industry.

A report published by the Research Board for the correlation of Medical Science and Physical Education (1946) expressed similar views, but stated that employers should not be expected to subsidize such a service other than by allowing employees to attend for advice and treatment during working hours.

A memorandum from the Association of Certifying Factory Surgeons (1947) stressed the importance of a medical service for every place of work, but that this should be separated from the National Health Service and be administered by the Factory Department of the Ministry of Labour and National Service. The shortage of medical personnel would of necessity limit the number of whole-time doctors employed and most of this work would have to be undertaken by part-time general practitioners acting as Appointed Factory Doctors under the Factories Act. The selection of doctors would remain in the hands of the employer guided by the Chief Inspector of Factories. An extension of routine annual re-examinations for persons up to the age of 20 or 25 and again after 60 years of age was also suggested.

The B.M.A. (1949) have recently formulated certain guiding principles in the development of a comprehensive Occupational Health Service. They are of opinion that the service should be wide in scope, embracing every aspect of occupational health, and should include the services of non-medical experts. Such a service should no longer be confined almost exclusively to factories as at present, but should be available to the whole working community and be acceptable to both management and employees. The Minister of Health should undertake both its planning and supervision because this body already has general responsibility for the national health. Specialist and general practitioner services as well as the public health and hospital services could, by a properly planned liaison, be brought effectively to bear on the problem of occupational health. The personnel required would have to be recruited from general practitioners already participating in the National Health Service, acting in a part-time capacity, and adequate training facilities should be provided for these men. Preliminary surveys should be undertaken by the Ministry of Health in order to ascertain the future needs of different areas and the particular character of the service required, such surveys to be followed by field trials within industry itself.

The Society of Medical Officers of Health (1950) have recently expressed the view that as occupational health is a specialized branch of preventive medicine, it has a basic relationship to Public Health. Its administration, therefore, should be undertaken by the Local (Public) Health Authorities under the general supervision of the Ministry of Health. This would have the effect of obviating the present lack of coordination and at the same time effect an economy in the use of medical manpower. In their opinion, no single authority except the Local Health Authority could provide a staff of officers sufficiently trained to undertake this work, pointing out that domestic and social conditions outside the scope of the place of employment are contributory factors to a state of subhealth. The factory medical service should logically continue the work of the school medical service in the same way as the medical services of the Armed Forces are directed towards the operational fitness of specially selected groups. The Local Health Authority, being the recognized center of preventive medicine, had a prestige gained of long establishment, was locally accessible and could act impartially. In order to conserve medical manpower, one or two whole-time

medical officers working from the Medical Officer of Health's department, could survey the whole needs of the area which could then be serviced by general practitioners acting in a part-time capacity. The Factory Medical Inspectorate, at present part of the Ministry of Labour and National Service, should logically be transferrd to the Ministry of Health but maintain a close relationship with its lay inspectors.

The Association of Industrial Medical Officers (1949) in a memorandum for presentation to the Industrial Health Services Committee set up by the Prime Minister, again stressed the inadequacy of existing services, pointing out that the annual cost to industry of accidents and industrial disease was estimated to be in the region of 300 million pounds sterling. There were in addition large problems concerned with sickness absenteeism, disablement rehabilitation for some 850 thousand people registered under the Disabled Persons Employment Act, and other far-reaching industrial problems of a psychological nature. The provision of adequate nursing and auxiliary medical departments (physiotherapy, ophthalmic, dental, etc.) would help to conserve medical manpower. They felt that voluntary industrial health services were better provided by management than otherwise, so that the industrial physician could take his place within the structural organization of industry as a member of the management team. Any kind of official service would tend to comply with uniform minimum standards rather than to strive for the best that could be obtained. The employment of whole- or part-time doctors would depend on the size of the organization, the geographical position of its factories, the number of employees and the specific hazards involved. Where a large number of small factories were close together, a full-time group industrial medical officer, working from a clinic staffed by nurses would meet the situation. In this way the full-time doctor would obtain more experience of industry, whereas for the part-time general practitioner, this forms but part of his activities. Coordination between the industrial physician and the practitioner employed in the National Health Service would continue as before on a personal basis, the former being mainly concerned with preventive, and the latter with curative medicine. Although there may be some overlapping, in general, provided the rules of ethical conduct were observed, no friction should arise. In the Association's opinion, the withdrawal of all industrial health services would be a retrograde step of the gravest social importance and would be contrary to the wishes of workers, employers and informed opinion generally, not only in this country, but abroad. The development of industrial health services should continue along present lines, the employer both establishing and maintaining his own medical service.

Medical supervision in the smaller factories might be provided by extending the duties of Appointed Factory Doctors for whom a definite standard of training should be laid down. Countrywide surveys of existing services, followed by field trials in extending the service should be undertaken on an experimental basis.

The views of a large Public Health Authority such as the London County Council (1950) are interesting. The Council considers that an extended industrial health service would prove economical both to industry and to the community, and that, as it is essentially a national responsibility, its cost should be met out of national funds. Industrial health supervision should be provided for all those not so covered in the smaller factories, and there should be scope for the part-time practitioner with an interest in this work.

Summary

THE future of British industrial medicine would appear to lie in one of several directions: by extending existing services, by the creation of a whole-time National Service, or by a combination of these two systems. As far as can be seen, the latter solution is impossible because of the shortage, not only of doctors trained for industrial work, but of doctors generally, while the financial position of the country, more particularly in view of recent estimates of the cost of the National Health Service, would preclude any such venture. Stewart (1950), in an admirable survey of the whole problem, warned against haphazard and uncoordinated development, any plan for extending existing services being related to the present economic crisis, having due regard to the needs and meaning of industrial health in all occupational groups. Such a service would have to be integrated with the National Health Service with due regard to economy in the use of medical manpower, and this could only be accomplished when the majority of industrial physicians would be acting in a part-time capacity. He envisaged an Occupational Health Service Bill which would vest in the Ministry of Health central authority empowered to supervise its development and carry out field surveys under a specially created Occupational Health Department guided by a National Advisory Council on Occupational Health. Thereafter, the organization would be administered on a regional basis, involving the appointment of whole-time regional consultants in occupational health. Industrial organizations already providing a medical service would be entitled to apply for registration on an Occupational Health Services Register, the standards for which would be laid down by the Minister of Health, while whole-time industrial doctors would be given a certain professional status and responsibilities. In this way, the various government departments at present concerned with industrial health could be brought under one central authority, i.e., the Ministry of Health, while the various occupational groups concerned,

including the nationalized industries, would pay the cost of their own services. He thought, however, that it would take three to four years before such a plan could be drafted.

In general it is fair to say that the change-over to state control of medicine in Great Britain has been accomplished smoothly and that, on the whole, the system is working satisfactorily. No one will deny however, that defects exist, mainly due to the shortage of both medical and nursing personnel and to lack of accommodation for the sick, so that some years must elapse before these can be remedied. It should not be forgotten that with the introduction of the panel system of practice under the National Health Insurance Act in 1911, and the various inroads into private practice which followed Public Health legislation, medicine in Britain has been conditioned to some form of state control for nearly 30 years, and that to a certain extent this has had some repercussions on the practice of industrial medicine.

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A "Discussional" on Industrial Health Programs

University of Michigan, School of Public Health, October 27 and 28, 1950

THIS "discussional" will provide a limited group of industrial Medical Directors opportunities for meeting with representatives of the faculties of the School of Public Health and School of Medicine, University of Michigan, in informal consideration of:

1. Recent trends in social, political, industrial and general medical relations having effects on industrial health programs.
2. Adjustments in industrial health programs possibly necessary to meet the new situations resulting from these trends with credit to the medical profession and benefit to the industrial people.

A FEW of the topics so far proposed for discussion are as follows:

(a) Industrial medical problems associated with the lengthening life span and pension plans for industrial employees.

(b) New opportunities provided for industrial physicians by medical research and the remarkable effects of some of the newer drugs.

(c) The extent to which industry is required to or should participate in medical care programs for employees and their families.

(d) What examinations should executives receive to assist them in the maintenance of their health, and from whom should they obtain them, plant doctors, or physicians in private practice, or clinics?

(e) Is alcoholism a disease and a public health problem, and, if so, is it also an industrial problem, and can it ever be an occupational disease? Under what conditions can it be regarded an occupational disease?

(f) Case finding surveys and other public health methods applied to industry.

(g) Recent trends in industrial medical education.

The "discussional" will be continued informally throughout its sessions and any industrial Medical Director or faculty member may introduce other topics as they occur to him.

SESSIONS will be held at the School of Public Health, 109 South Observatory Street, Ann Arbor, beginning at 9:30 A.M., October 27, 1950. Registration will begin at 9:00 A.M. in the second floor lobby. Sessions will close promptly at 4:00 P.M., October 28.

"THE IMMORTALS"

The Fifth Ramazzini Rendezvous

—June 22-24, 1950—

NEWSPAPERS the country over, near June 26, carried stories that in the San Francisco Bay area at the time of the American Medical Association sessions, 24 other national medical organizations assembled. That was an error The number was larger. In this overplusage was the RAMAZZINI SOCIETY. The lusty members of this lusty Society foregathered, in keeping with its traditions for temporary anonymity, at the gracious Alta Mira Hotel in Sausalito, California, a tiny city tucked beneath the mountains, near the north end of the Golden Gate Bridge. For three days, June 22, 23, 24, the RAMAZZINIANS became the "unreachables" .... men without an address.

Dubbed by some on the outside, but never by those within, and perhaps only euphemistically, "The Immortals," the RAMAZZINIANS as to their Society recognize no immortality save as to the imperishability of goodwill among those physicians who live and serve in the world of occupational diseases.

This well-knitted group prides itself that it functions without officers, constitution, by-laws, rules, scientific programs, and—praise to Heaven —without dues. Its affairs are delegated to "servants." The distinguished servants for the California assembly were DRS. RUTHERFORD T. JOHNSTONE, CHRISTOPHER LEGGO and ROBERT T. LEGGE, all of California.

The RAMAZZINIANS are given to strange beliefs, customs and practices. In sober fashion they are dedicated to the memory of BERNARDINI RAMAZZINI, the historic father of all medical industrial hygienists. But the manner of doing homage is conditioned to that believed most likely to have RAMAZZINI'S approval were he present—hearty. At times the flavor is more Boccaccian than RAMAZZINIAN.

Deeply etched in RAMAZZINI lore is the tenet that no man is fully adult unless with gusto he may laugh at himself, his foibles, his mannerisms, his pomposity, his embonpoint, his neuroses, his pedantry. Ample opportunity arises for laughter .... nothing is sacred. In complete antithesis is the tenet that all men are but boys grown tall and bald. Every man, in the trying cares of arduous professional pursuits, longs for the joys of his boyhood, the ragged clothes, the dirty face, the indiscretions of food, undeserved praise .... all those things the psychologists label "unconditioned love."

Lest all this smack with too strong a flavor of only the Rabelaisian, let there be recorded the sturdiness and sobriety with which DR. ANTHONY J. LANZA, the Orator for the year, presented his learned discourse on "Paracelsus" (otherwise formally known as Theophrastus Bombastus von Hohenheim), a predecessor of RAMAZZINI and perhaps the truly first of medical industrial hygienists. It was concluded that the never-ending irascibility of Paracelsus well qualified him for membership in any RAMAZZINI SOCIETY. That RAMAZZINI Oration, elsewhere published in this issue, speaks for itself, for DR. LANZA, and for the RAMAZZINI SOCIETY.

One day was spent at nearby San Quentin Prison at the invitation of WARDEN DUFFY but under the direct egis of the Medical Director, DR. LEO STANLEY, the author of the widely read "Men at Their Worst." This was no gleeful holiday among the murderers, but an earnest effort to grasp the significance of the nationally heralded enterprises of WARDEN DUFFY to rehabilitate the warped minds of men involved in crime. Every large prison is a gigantic industry, and San Quentin is no exception. At every turn arose opportunity to appraise industrial hygienic installations or their absence. Even the death chamber, where execution is accomplished through the quick and merciful action of cyanides, did not fail to attract toxicologic attention.

The Ramazzinians move as one, think as one ... and eat as one

Volumes of surplus cyanide gas are discharged well above the nearest building, but wonder is in order as to what might happen if just the wrong type of wind currents at the minutes of execution swept the great excess downward into nearby cells. Industrial hygienists have their place even in prisons.

In a mood for paying homage, the RAMAZZINIANS traveled their way to Muir Woods. Every man, woman or child who looks upward to the top of any tall tree knowingly or unknowingly pays tribute to John Muir, the pioneer conservationist of nature, and saviour of our big trees, the oldest living things on earth.

The 1950 "taurodium" of the RAMAZZINIANS culminated in their becoming the guests of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, at the Clift Hotel in San Francisco. This session, shorn of scientific import, fully was in keeping with the lighter objectives of the RAMAZZINI SOCIETY.

One of the virtues of the RAMAZZINI SOCIETY is its ruthlessness in laying aside in royal purple those members feeling no need of the laughter either of the boy of seven or the adult of 70. Quickly they are replaced by the acolytes of happy mind among the medical devotees to industrial hygiene and to RAMAZZINI. Sausalito saw added to the ranks—never exceeding 31—five new RAMAZZINIANS now named: DR. EDWARD H. CARLTON, DR. DUDLEY A. IRWIN, DR. ROBERT COLLIER PAGE, DR. THOMAS L. SHIPMAN, and DR. ARTHUR J. VORWALD.

THE toiling feet of next year's servants, DRS. ANTHONY J. LANZA and WILLIAM J. MCCONNELL, who in 1951 will find a remote sanctuary for the RAMAZZINIANS along New Jersey's Atlantic coast, may not yet have come to the opportunity to announce elections. Those named physicians whom it is the desire of the RAMAZZINIANS to honor, and to share pleasures with, may find in this item the first word of their election. Possibly they are committed to no acceptance, but to be a medical industrial hygienist and to have been invited to become a RAMAZZINIAN and not accept —such person might just as well never have been born at all.

The Ramazzini "servants" for 1950, Drs. Christopher Leggo, Robert T. Legge, and Rutherford T. Johnstone

A guest of the Ramazzinians was Dr. G. W. H. Schepers of Johannesburg, South Africa

Some of the Ramazzinians assemble on the balcony of the Alta Mira Hotel, Sausalito, California

Dr. Anthony J. Lanza delivers the Ramazzini Oration on Paracelsus

PARACELSUS

—The 1950 Ramazzini Oration—

ANTHONY J. LANZA, M.D.,
New York City

PARACELSUS was born in Switzerland in 1493. His father was a physician named Wilhelm von Hohenheim and he himself was named Philip Theophrastus Bombastus von Hohenheim. In accordance with the custom of the times he called himself Paracelsus. When he was still a small boy, about nine years old his family moved to Villach, a mining town in Carinthia, where his father was appointed a municipal physician.

Philip Theophrastus Bombastus von Hohenheim

The fact that Villach was a mining town was to have a profound effect on Paracelsus. His bent was toward medicine, but he acquired a first-hand acquaintance with the mining and smelting industries. He learned about working conditions and he also obtained a knowledge of chemistry, at least such as pertained to the industrial processes in his home town.

He studied medicine at the University of Ferrara. From his father he apparently inherited the faculty of observation of natural processes and a marked tendency to demand the underlying reasons for the phenomena he observed, together with an unwillingness to accept such explanations as were available in current textbooks or teachings. He wanted to know—and he was reluctant to accept an explanation or a procedure which could not be substantiated by something more than a dubious tradition. These traits produced their inevitable result. He became dissatisfied with and distrustful of the accepted methods and doctrines of medical education. He travelled far and wide looking for centers of learning more congenial to his tastes. He visited many countries—Sweden, England, Poland, Lithuania, Turkey, and Greece—practicing medicine as he went. He noted carefully everything that came within his observation. He was interested not only in matters medical but also in working conditions, industrial processes, and social customs.

He evolved his own system of medicine, which included his own ideas of the nature and cause of diseases, as well as methods of treatment and therapeutic agents. Both his ideas and his methods, needless to say, were at complete variance with those commonly accepted. This did not enhance his popularity in the medical profession. In 1527 he accepted the position of municipal physician at Basle, which included the privilege of teaching at the University. This lasted two years, when his unorthodox views and practices resulted in his being forced to leave. Finally, after further wanderings he came to the city of Salzburg in 1541. He was 48 years old, and prematurely aged by his arduous and contentious life. He died at Salzburg in September of the same year.

SO MUCH for the bare outline of the life of Paracelsus. What has been stated so far is not open to dispute; and it is generally conceded also that Paracelsus was impatient, quarrelsome, rough in his manner, bitter and vindictive against all who opposed him or disagreed with him, and that, in turn, he was the victim of abuse, misrepresentation, villification and bitter enmity on the part of the medical profession. That also is well attested and not open to debate. He wrote many books and essays but, with one exception, was not successful in getting them published during his lifetime.

Now, 400 years later, when we attempt to appraise the man and his work we find ourselves embarked on a foggy and obscure course. Some years ago Henry Ford, in one of his few public utterances said, "History is bunk." My efforts to throw a feeble light on the life of Paracelsus have convinced me of the basic truth of Mr. Ford's remark. The historical edifice you may build on the scant foundation of available fact will be moulded and conditioned by your own habits and thoughts, and your likes and prejudices. Where one historian will erect an Hellenic temple another, from the same material, will evolve a French chateau. Truly history frequently is the bunk.

Consider the variance in the available histories of such persons as General Grant, Theodore Roosevelt, Woodrow Wilson. They lived but yesterday. With uncertainty and confusion in the

near view, what may we expect from the far one? We can only hope that when we project our historical telescope backward through 400 years, the distance will lend enchantment to the scene.

Paracelsus was at odds with his environment and his times. What kind of times? Troubled times, probably as difficult and troublesome as today. Martin Luther was on the war-path, fanning the fires of the Reformation. Germany had become largely Protestant. Although Paracelsus was against the established order, professional and social, he adhered to the old religion. It is interesting to note that Agricola, who lived at the same period and who affords an interesting comparison with Paracelsus, also repudiated Martin Luther and all his works, to his own disadvantage, although he managed to maintain himself on a firm footing with the Protestant rulers of Saxony.

Their views on religion and their interest in industrial medicine are seemingly the only two points of resemblance between these two contemporaries.

In their magnificent translation of Agricola's "De Re Metallica," Herbert and Lou Henry Hoover make this comment:

"Yet no comparative study of the unparalleled egotistical ravings of this half genius (Paracelsus), half alchemist, with the modest sober logic and real research and observation of Agricola can leave a moment's doubt as to the incomparably greater position which should be attributed to the latter as the pioneer in building the foundation of science by deduction from observed phenomena."

On the other hand, Henry Sigerist, of the Johns Hopkins Institute of the History of Medicine, has this to say about Paracelsus ("Four Treatises by Paracelsus," J. H. Press, 1941):

"He conceived disease in different terms than heretofore and applied in his therapy drugs, particularly chemical compounds, many of which had not been used before. A scientist and mystic, he tried to determine the place of man in the world, his relation to God, the cause of disease and its meaning.... He was to be the Luther of medicine, and, since the people refused to listen, he yelled his message at them and became more and more bitter and aggressive.... In publishing this book we wish to contribute our share in reviving the personality of an honest man who was a great physician and a staunch fighter for what he considered the truth."

Apparently Paracelsus was a popular lecturer —occasionally, at least. He scorned the authorities and advocated his own therapy and his own ideas, based on his experiences and observations. On one occasion he publicly burned the works of Galen.

Again to quote Sigerist:

"He is very German in his desperate struggling for a philosophy that would unriddle heaven and earth and also in his unbalanced aggressiveness."

HARDLY any of the writings of Paracelsus appeared during his lifetime. His treatise on miners' sickness and other miners' diseases was published in 1567, 11 years after "De Re Metallica" and 26 years after the author's death. His writings covered a wide range. One of his contributions was a book on "Nymphs, Sylphs, Pygmies and Salamanders, and on the other Spirits." In his views regarding these supernatural beings, he mirrored the accepted certain beliefs of his times, and Agricola was also in accord. To quote from the Hoover translation of "De Re Metallica" (p. 217, footnote):

"Agricola fully accepted the presence of demons or gnomes in mines. He speaks of 'demons of ferocious aspect' but he also regarded some of these beings as distinctly helpful and of kindly intent, venerable looking, clothed in a leather apron, and they laugh with glee."

So remote from present scientific concepts were the firmly fixed beliefs of Paracelsus and his contemporaries that something may be gained by a brief quotation deriving from his book "On the Miners' Sickness":

"Now, concerning the wounds caused by lightning, note that they alone are like a burn, and are not to be treated otherwise than with axungia porc (lard), which is melted very hot and poured into succum basbae and then made into a salve. For the same purpose, boil milk with crayfish and then apply it as a salve. And, wherever wounds have to be healed or skin closed, this should be done by means of the egg salve and the drying powder. Know, further, concerning the wind and the dragons which also occur in the mountains, that auricular muris should be added to all medicines because it has a special property to overcome and expel these things."

In many respects of life we have come a long way since the days of Paracelsus. But one may, perhaps, be pardoned for an occasional temptation to feel that, after all, there are still dragons in strange places.

SO FAR we have been discussing the factual data in the life of Paracelsus, and I believe that this information is reasonably accurate. What can we say as to his contribution to industrial medicine?

Dr. George Rosen published in 1941 a translation of four treatises selected from the writings of Paracelsus, among them the one entitled "On the Miners' Sickness and other Miners' Diseases." Historically, this is one of the earliest, if not the first, of medical treatises on a specific occupation. He describes the miners' sickness or lung sickness (bergsuchtig) at length, and this has to be read to be appreciated. Paracelsus believed that diseases arose from "gas" in the atmosphere, which "gas" was produced by the power of the stars. Miners' sickness came from the Milky Way. He makes an interesting observation, that, as the experienced physician (presumably himself) recognizes what stellar areas

produce types of diseases, "death is incurable since the heaven of this constellation has never been found." This merely suggests the extraordinary mixture of supernatural imaginings and clinical observations that make up the text of his treatise. In the times in which Paracelsus lived the supernatural loomed much larger in the daily lives of peasant and scientist alike, than at present. On the other hand, consider the following quotation from the same source:

"But everyone should endeavor to be well instructed concerning this disease according to the old nature, consequently one should gather experience in these mineral diseases and learn in those places where these diseases are and live; for the physician becomes learned through this exercise and experience. For even if I should report and describe everything, still no one would be able to understand it without the experience. Thus if he wants to have the experience, let him acquire it where it is, that is among the mineral diseases. For who could be taught the knowledge of experience from paper, since paper has the property to produce lazy and sleepy people, who are haughty and learn to persuade themselves and to fly without wings, all of which things are repugnant to the physician. Therefore the most fundamental thing is to hasten to experience."

This one paragraph states the philosophy of industrial medicine from alpha to omega.

Paracelsus, who describes himself as an astronomical physician, also wrote at length on the cure of disease and the specific therapeutic remedies which he advocated. This part of his writings is almost as difficult to understand as his theories about the stars and their method of influencing the universe. Those of you who are interested may read them at your leisure.

Paracelsus also delved into psychiatry and wrote a treatise on diseases that deprive man of his reason. One of the most fascinating works is the treatise previously mentioned on nymphs, sylphs, pygmies and salamanders. Nymphs live the water, sylphs in the air, pygmies in the earth and salamanders in fire, and he points out that we can recognize how marvelous God is that he does not leave any element void and empty. In this, Paracelsus reflected the beliefs of his times.

IN SUMMARY we may conclude that Paracelsus and Agricola both had a thorough knowledge of mining and of the industrial processes allied thereto. If one may judge from his book, Agricola, while a physician, had an engineering type of mind, a combination of talents which is not uncommon in our times. Paracelsus, though recognizing the importance of environmental conditions, was more concerned with his theories of the causation and treatment of disease and the relationship of disease to the whole cosmic concept which he accepted as truth. It is apparent that he was out of step with his times. He was quarrelsome, opinionated, abusive towards his enemies, and occasionally his conduct seemed that of the quack and the exhibitionist. Regardless of his peculiarities of conduct and belief, however, there can be no doubt that he was a leader and a pioneer. He helped to establish industrial medicine as a branch of medical science, and his influence persisted for many years. In every age since the beginning of time man is resentful of anyone who disturbs the status quo and who criticizes the established order. Only subsequent ages can appreciate the large share that trouble makers have in stimulating progress.

With justice, and in a spirit of humility, we may recognize in Paracelsus one of the great founders of the art and science of industrial medicine, to which, as Ramazzinians, we pay our tribute.

The Alta Mira Hotel, Sausalito, California

The Relationship Between Truck and Tractor Driving and Disorders of the Spine and Supporting Structures

— Report of a Survey —

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AT LEAST 15,000,000 persons daily or intermittently operate commercial trucks, farm tractors, buses, taxicabs, locomotives and construction equipment. On the farms a high proportion of the drivers are women and adolescent boys and girls.

These figures exclude the vast number of operators of rough-riding vehicles and equipment in the Armed Forces.

A review of the medical literature reveals few references to the possible etiologic factors in various disorders of the spine and supporting structures as related to truck and tractor driving. Persons familiar with the design, manufacture and operation of the more than 10,000,000 vehicles of these types are in agreement that the problem of preventing shock, jolts, jerking and vibration of the human operators has not been solved as it has in the passenger car. The solution of the so-called "ride-problem" on these vehicles represents an engineering task, discussion of which has no place here.

How much of a medical aspect there is to the occupational conditions inherent in the operation of rough-riding vehicles is a subject that has not received the attention and study it deserves, except possibly in the field of aeronautics. The Army Air Forces and the German Luftwaffe, during the last war conducted extensive research on the vibration effects of planes on human beings.

So far as can be determined it was not until 1938 that an organized study of the occupational hazards of truck drivers was undertaken.[1] Even in this study all aspects of the "ride problem" appear to have been totally ignored. One noteworthy finding of the study was that the leucocyte counts of truck drivers as a group are higher than counts reported for workers in other occupations or the general population. The cause of this, after fatigue and carbon monoxide were ruled out, was left as an unanswered question. Further studies are indicated to determine whether this high leucocyte count is related to the constant shock and vibration suffered by the drivers, or to some other operational factor. Surveys on truck driving and fatigue now, however, are being carried out at the Harvard Fatigue Laboratory under grants from the American Trucking Association and a number of casualty insurance companies.

Conducted under a grant from the Bostrom Manufacturing Company, Milwaukee 4, Wisconsin.

Recently Clayberg,[2] in a discussion of the pathologic physiology of truck and car driving, pointed to a number of conditions related to the jarring to which truck and car drivers are subjected.

THE survey on which this report is based was undertaken to throw more light on the relationship between disorders of the spine and supporting structures and the driving of trucks and tractors. A questionnaire, so worded as to avoid specific reference to the seating factor, was sent to all the orthopedic surgeons in the United States.

To the 1,474 questionnaires mailed out, replies were received from 378, or 25.6%, an unusually high return from surveys of this nature. This indicates a widespread interest in the subject. This is further emphasized by requests for a copy of the report on the survey from 327 of those replying to the questionnaire.

In answer to question No. 1: "Have you seen patients in whom disorders of the spine and supporting structures might be ascribed to driving in trucks or tractors," 109 reported "none," 179 reported "a few," and 54 reported "many." The remaining 36 believed that driving trucks or tractors was an aggravating, not a causative factor although some of them noted they had not encountered enough of these cases to form a definite conclusion. Familiarity with a suspected cause naturally affected the replies—orthopedists who had driven trucks, jeeps or farm tractors had personal knowledge of the tremendous shock and jolts suffered in operating such vehicles.

This is made obvious by the replies to question No. 2: "If you have seen such patients, what is the approximate number?" Although some furnished an estimate covering several years and a few a percentage (5% in most cases), the greater number provided an estimated yearly figure. One, for example, said "Several hundred in past 25 years." The total of the specific figures in the replies was 7,851 cases. When it is considered that this figure must represent only a small percentage of all cases that have been seen, let alone recognized, by all physicians in the country, it becomes clear that the situation constitutes a problem that should be of major interest to the medical profession and to the truck and farm tractor industries.

The following is a tabulation of the answers received to question No. 3: "Which of the fol-

lowing specific disorders do you believe may have been caused in whole or in part by driving trucks or tractors?"

Spinal injuries	25
Herniated discs	95
Osteoarthritis	103
Spondylitis	41
Subluxation	20
Sacroiliac strain	72
Traumatic fibrositis	109
Coccygodynia	82

In addition to the disorders listed in the questionnaire, 37 others were named in the replies received.

Lumbosacral strain was named by 26 orthopedists, low back strain by six, aggravation of spondylolisthesis, pilonidal sinus (jeep disease) and sciatic syndrome by two each. The following were named by one each: spinal strain associated with muscle spasm, muscular strain, chronic strains (static decompensation), spinal strain, sciatic neuritis, sciatica, sciatica perineuritis, low back pain with or without sciatica on postural basis, malposture, postural backache, malposture and faulty or excessive tension, lumbosacral arthritis, arthritis, scalenus anticus syndrome, compression fracture, pilonidal cyst infections, physical allergy, adult round back, anatomical anomalies, toxic fibrositis, acute myositis, myositis of lumbar muscles, traumatic loss of the normal lumbar curve, mechanical backache secondary to horizontal sacrum, all low back conditions, strain, functional low back symptoms, disc degeneration, degeneration or collapse of lumbosacral intervertebral disc through continued traumatization, structural defects, back weakness and disability due to lack of proper muscular development, and abdominal symptoms resembling those of appendicitis.

While the foregoing nomenclature is that of the orthopedists answering the questionnaire, and may be subject to some controversy, it nonetheless is another imposing indictment of the ordinary truck and tractor seat as a health menace of no small proportions.

Summary

AT LEAST 15,000,000 persons in the United States daily or intermittently operate trucks, farm tractors, buses, taxicabs, locomotives and construction equipment, exclusive of the huge number of operators of rough-riding equipment in the Armed Forces.

2. A review of medical literature reveals few references to the possible etiologic contributions of truck and tractor driving to various disorders of the spine and supporting structures. A recent (1949), paper[2] by Clayberg on the pathologic physiology of truck and tractor driving points out a number of conditions related to the jarring to which truck and car drivers are subjected.

3. So far as could be determined no formal study of the occupational hazards of truck drivers was undertaken until 1938. Even in that study[1] the "ride problem" was completely ignored. Now, however, studies of truck drivers and fatigue are being made by the Harvard Fatigue Laboratory under grants from the American Truck Association and a number of casualty companies.

4. From findings available it appears that the question of how much of a medical aspect there is to the occupational conditions inherent in the operation of rough-riding vehicles, except possibly in the field of aeronautics, is one that has not received the attention and study it deserves, especially when the number of such operators is considered.

5. For more information on the relationship between disorders of the spine and supporting structures and the driving of trucks and tractors this survey was made.

6. A questionnaire, so designed as to avoid specific reference to the seating factor, was mailed to the 1,474 orthopedic surgeons in the United States. More than 26% replied. Interest in the subject was further revealed by requests for copies of the report of the survey, received from 327 of the 378 physicians returning the questionnaire.

Conclusions

A SURVEY of orthopedic surgeons in the United States definitely establishes that the regular seating on trucks and tractors either causes or aggravates a number of disorders of the spine and supporting structures of drivers. A total of 7,851 cases was reported by those answering the questionnaire. Forty-five disorders were named in the answers.

With more than 10,000,000 trucks and tractors being operated in the United States, exclusive of those in the Armed Forces, the health hazards of driving such vehicles constitute a major medical problem that has not received the attention and study it deserves, either by the medical profession or the manufacturers of such equipment.

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References

1. JONES, B. F., *et al.*: Fatigue and Hours of Service of Interstate Truck Drivers. *Public Health Bulletin* No. 265, 1941.

2. CLAYBERG, CAPT. HAROLD D.: Pathologic Physiology of Truck and Car Driving. *The Military Surgeon*, 105:299 (October) 1949.

PRODUCTS RESEARCH AND DEVELOPMENT

A Controlled Industrial Study of an Analgesic Compound, Edrisal with Codeine

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IN 1946 we reported our favorable results in controlling the psychic and physical discomforts of dysmenorrhea with Edrisal.[1] In the course of that clinical investigation a few patients were not controlled by the medication, and needed something stronger to give them comfort. We gave them an analgesic pill containing codeine, with the formula phenacetin 2½ gr., aspirin 3½ gr., caffeine alkaloid ½ gr., and codeine sulphate ¼ gr.

However, in view of our excellent results with Edrisal, we suggested to the manufacturers of this compound that they add ¼ gr. of codeine sulphate to the Edrisal formula. We then could run a comparative clinical investigation on the relative merits of the two codeine-compound analgesics in pain-producing syndromes, including dysmenorrhea. From June 1, 1949, to March 1, 1950, we have offered these compounds to 500 consecutive employees suffering painful conditions.

Two hundred and fifty of these received Edrisal with codeine sulphate ¼ gr. (Edrisal with codeine) and 250 received phenacetin, aspirin and caffeine with codeine sulphate ¼ gr. (P.A.C. with codeine). The medication was given to alternate patients. The dose in each instance was two tablets, and both drugs were supplied to us in tablets of the same appearance so that patients could not distinguish between them. The interviews following the medication were conducted entirely by personnel trained in listening to comments without offering positive or negative suggestions. Only voluntary spontaneous comments were recorded, either favorable or unfavorable.

TABLE I shows the comparative results in the series. Our use of descriptive terms has been rigid. "Satisfactory" means that the pain disappeared completely after the medication was taken. "Failure" means that it was not so affected by the drugs. If the pain were primarily controlled and then returned, it was so recorded under "Reactions."

Reference to the table shows a favorable margin in using the Edrisal with codeine; 219 responses (87%), compared with 207 (83%). The failures were 13% for Edrisal with codeine and 17% for P.A.C. with codeine.

In two considerations in this table, the Edrisal with codeine compound was superior to the P.A.C. with codeine preparation. First is the matter of sleep. Amphetamine sulphate is used often to stimulate general wakefulness and cerebral activity, and every patient receiving Edrisal with codeine as we gave it, would necessarily get 5 mg. of amphetamine. Nevertheless, 232 of the 250 slept well, 17 had fitful sleep, and only one did not sleep. This would argue for the synergistic balance in this compound between amphetamine and codeine. In the group given P.A.C. with codeine 211 slept well, 30 had fitful sleep, and six did not sleep at all.

Apparently caffeine is a much stronger cerebral stimulant in the dosage used than is amphetamine.

TABLE I.
COMPARATIVE RESULTS

	Edrisal With Codeine	P.A.C. With Codeine
Satisfactory	219	207
Failure	31	43
Sleep:		
Slept well	232	211
Fitful sleep	17	33
No sleep	1	6
Reactions:		
Pain returned	23	22
Others	6	4
Time loss	20	17
Spontaneous favorable comments	77	53
Total individuals treated	250	250

TABLE II.
PAIN DUE TO TRAUMA

Edrisal with Codeine			P.A.C. with Codeine		
Out of 35, 34 were satisfactory; 1 failure			Out of 63, 57 were satisfactory; 6 failures		
Sleep—33 slept well; 2 fitful; none had no sleep			Sleep—53 slept well; 7 fitful; 3 had no sleep		
Reaction: Pain returned—6 Mild itching—1 Little nausea—1			Reaction: Pain returned—8 Dizziness—1 Nauseated—1		
Time loss—2			Time loss—1		
Unusual comments—Very good—2			Unusual comments: Very good—1		
Breakdown of Injuries:	Satisfactory	Failure	Breakdown of Injuries:	Satisfactory	Failure
Fingers	15	1	Fingers	24	3
Hands	2	0	Hands	4	0
Arms	2	0	Arms	5	0
Feet	4	0	Feet	7	2
Legs	5	0	Legs	4	1
Head	1	0	Head	3	0
Back	4	0	Back	9	0
Shoulder	1	0	Thorax	1	0

This study was completed with the technical assistance of ALMA F. BROWN, R.N., GUSSIE JASPAN, R.N., JANE JONES, R.N., and MABEL REYNOLDS, Medical Secretary. The drugs used in this work were supplied by the Research Division, Smith, Kline & French Laboratories, Philadelphia.

The second advantage of Edrisal with codeine is seen in the personal reactions of the patient to the medication. There were 77 spontaneous favorable comments concerning Edrisal with codeine, compared to 53 for P.A.C. with codeine. It has been pointed out previously ("Edrisal in the Management of Dysmenorrhea"[1]) that amphetamine has an analgesic and a euphoria-producing faculty. Possibly the presence of the amphetamine sulphate in this preparation may have increased its favorable reception as compared to P.A.C. with codeine.

When we turn to the individual conditions for which we have used these medications, pain associated with accidental injury is the first to be considered.

Pain disappeared promptly for 34 out of 35 people offered Edrisal with codeine (97%), as compared to 57 out of 63 offered P.A.C. with codeine (90%). An interesting facet of this table is the return of pain. For Edrisal with codeine, it recurred at a rate of 17%, compared to a rate of 13% for P.A.C. with codeine. In the Edrisal group the pain did not cause lost sleep to anyone, while in the P.C.A. group three individuals (5%) spent a sleepless night. (Table II.)

Turning next to headache (Table III), it must be understood that our usual management of this condition is the use of plain aspirin or plain Edrisal, and that in most instances our employees get sufficient relief to stay at their jobs and complete the work-shift. The medication used here, therefore, was reserved for those persons known to our staff as those who usually suffer incapacitating headaches, often of a migraine type.

In this group Edrisal with codeine gave 88% satisfactory results compared to 80% for P.A.C. with codeine. No night's sleep was lost by the Edrisal group while 3% of the P.A.C. group were awake all night. The favorable comments were at a rate twice as frequent in the Edrisal as in the P.A.C. group. One chronic migraine sufferer had such dramatic relief that her physician called us to know the name of the drug.

We have referred to various conditions producing pain in which these two compounds have been used. There were 17 of these conditions. We also pointed out that the patients were given the drugs in strict alternate rotation, regardless of diagnosis. This has led to a curious situation in our tabulation of employees suffering severe dysmenorrhea, for we find it chanced that 55 received Edrisal with codeine, but only 15 received P.A.C. with codeine. No comparison is possible in such unbalanced figures, but it is feasible to compare our results in the 55, with our previously reported results using plain Edrisal in dysmenorrhea.[1]

The satisfactory rate in *severe dysmenorrhea* using Edrisal with codeine was 85%, and, among the failures, only 9% lost a shift of working time. *These are the same kinds of cases in which the failure and lost time rates were both 100% in our original series.*

In the rest of the pain-producing conditions none had sufficient totals to warrant individual comparison, so we must group them under the general heading of "Miscellaneous." Sixty-nine were given Edrisal with codeine, with 57 satisfactory results, 12 failures—a success rate of 83%. One hundred and seven were given P.A.C. with codeine—of which 83 were satisfactory, and 24 failed to receive help—a success rate of 77%.

TABLE III.
HEADACHE

Edrisal with Codeine	P.A.C. with Codeine
Out of 91, 81 were satisfactory; 10 failures	Out of 65, 52 were satisfactory; 13 failures
Sleep—85 slept well; 6 fitful; none had no sleep	Sleep—56 slept well; 7 fitful; 2 had no sleep
Reaction: Pain returned—5 Dizziness—1 Rash on face—1 Nausea and irritability—1	Reaction: Pain returned—3
Time loss—4	Time loss—4
Unusual comments: Relief within one hour—9 Always had to go home before—1 Very good—11 Migraine—has gotten more relief than from anything else—2 Medicine (Edrisal) seems to give more relief than previous preparation (PAC)—1 Got such relief that her physician called to find name of tablets—1	Unusual comments: Relief within one hour—5 Wanted to know name of tablets—2 Very good—7

TABLE IV.
DYSMENORRHEA (EDRISAL WITH CODEINE ONLY)

Out of 55, 47 were satisfactory; 8 failures
Sleep—49 slept well; 6 fitful; none had no sleep
Reaction: Pain returned—8
Time loss—5
Unusual Comments:
Did not have to go home as usual—1
Edrisal did not help but Edrisal with codeine did—2
Relief within one hour—4
Better results than with any other medication—1
Wonderful—2
Very good—10

Comment

TABLE V summarizes the percentages of success following the use of each drug combination in three painful conditions.

Edrisal with codeine has a consistent 5 to 8% advantage over P.A.C. with codeine. In both drug combinations there are equal doses of aspirin, phenacetin and codeine sulphate. Any difference in action, therefore, must be ascribed to those formula fractions that differ. Each Edrisal with codeine tablet contains 2.5 mg. amphetamine sulphate. Each P.A.C. with codeine

TABLE V.
PERCENTAGES OF ANALGESIC SUCCESS

	Edrisal with Codeine	P.A.C. with Codeine
Pain due to trauma	97%	90%
Headache	88%	80%
Miscellaneous pain syndromes	83%	77%

tablet contains ½ gr. of caffeine alkaloid. Either our results connote a *synergism* between amphetamine sulphate and the other three standard drugs in producing analgesia and fostering patient comfort, or they mean an *antagonism* between caffeine alkaloid and the three standard analgesics toward establishing such effects. The place to answer the problem of the mechanism is not here, but in a pharmacological laboratory. Suffice it to say that our *clinical* results have been consistent enough to convince us that Edrisal with codeine provides better relief for more patients with painful syndromes than does P.A.C. with codeine. We have, therefore, adopted Edrisal with codeine as our analgesic of choice in our industrial medical practice.

Summary

WE REPORT on a group of 500 employees treated for various different pain-producing syndromes. Two hundred and fifty were offered a new compound, Edrisal with codeine. Two hundred and fifty took a standard compound, P.A.C. with codeine. As nearly as possible, like syndromes were compared. The compounds were given in alternate rotation, and the patient had no knowledge of any difference in formula.

2. Pain was completely abolished in 87% of those given Edrisal with codeine, and in 83% of those receiving P.A.C. with codeine. Sleep was more often disturbed in the P.A.C. with codeine group than in the patients given Edrisal with codeine. Spontaneous favorable comment occurred almost twice as frequently among the Edrisal group as among the P.A.C. recipients.

3. In pain due to trauma, headache and miscellaneous pain syndromes Edrisal with codeine gave 5 to 8% better results than P.A.C. with codeine.

4. In *severe* dysmenorrhea we had 85% success in overcoming pain and only 9% loss of a work shift using Edrisal with codeine as compared to 100% failure for pain and a 100% lost-time rate in our previous series treated with plain Edrisal.[1]

Reference

1. LONG, CHARLES-FRANCIS: "Edrisal in the Management of Dysmenorrhea." INDUSTRIAL MEDICINE, 15:12, 679 (December) 1946.

LETTERS

Parathion Poisoning

TO THE EDITORS: Parathion (O,O-diethyl O-p-nitrophenyl thiophosphate) has proved so highly efficient as an insecticide or pesticide that its importance economically is apparent and its usage is rapidly becoming widespread in agricultural communities. Unfortunately parathion is highly toxic for man as well as for insect life. It may be handled and applied safely if, and only if, stringent precautions are strictly observed. However, in spite of the emphasis placed on the need for such precautions excessive absorption may occur through relaxation of these precautions or through accidental heavy exposure. Physicians may, therefore, be confronted with cases of poisoning from this compound. The management of acute poisoning by a cholinesterase inhibitor is a medical emergency of a type seldom if ever up to this time encountered in medical practice. The following summary of information now available should thus be of interest to physicians. From this it will be apparent that in this medical emergency the proper timing and dosage of the antidote atropine may be life saving.

The systemic effects of parathion are qualitatively similar to those of other cholinesterase inhibitors, and to the effects of the acetylcholine analogues (pilocarpine, muscarine, arecoline, mecholyl, doryl). Effects of parathion are interpreted as the result of accumulation of endogenous acetylcholine at synapses of the nervous system. They include giddiness, headache, nausea, vomiting, abdominal cramps, diarrhea, miosis, sweating, salivation, lachrymation, confusion, weakness, and muscular fasciculations. A sense of tightness is felt in the chest as the bronchi constrict and fill with mucus. Fatalities appear to result from constriction and secretions in the bronchi or arrest of the heart. On the other hand, recovery from the acute poisoning is usually complete and uneventful. There has been no evidence of permanent injury in such cases.

Treatment may be effective if atropine, grains 1/100 to 1/50 (0.65 to 1.3 mg.), is given at once and every hour or oftener as needed to keep patient fully atropinized (mouth dry, pupils dilated). If the lungs have filled before the atropine takes effect, clear the bronchi by postural drainage. Oxygen is then indicated. Morphine is contra-indicated. Muscular fatigue and weakness may reach a degree requiring artificial respiration. Following even mild symptoms no additional exposure to parathion or other phosphate esters should be allowed until time for cholinesterase regeneration has been given.

Intoxication by parathion or other CE inhibitors is an acute episode of 24 to 48 hours. It is terminated by cholinesterase regeneration and is followed by a period of gradually decreasing susceptibility to small exposures. Successive parathion exposures may deplete cholinesterase reserves progressively and create a susceptibility to small doses of tetraethyl pyrophosphate or vice versa. Since CE is regenerated rather slowly in man, patients who have suffered parathion poisoning should not be permitted to experience further possible exposures to this compound until it has been established that CE blood levels have returned to normal. Parathion and other phosphate insecticides are not locally irritating, but they produce local cholinergic effects. There has been no chronic or cumulative action other than that on CE as previously described. Dangerous parathion residues have not been detected on food crops sprayed at the proper stage before harvest.

—D. O. HAMBLIN, M. D.,
Medical Director,
American Cyanamid Company.

INDUSTRIAL MEDICINE IN THE PUBLIC EYE

Industries Act to Keep Check on Health of Their Leaders

HOWARD A. RUSK, M.D.

(In New York Times, July 30, 1950)

IN A CRITICAL inventory of our present situation, one important problem comes to the top at once. This is the health of our leaders, specifically of our industrial executives.

Although there is no direct evidence that mortality rates from heart disease are higher among business men than others, one can hardly read the daily obituary notices without seeing a note of one or more young executives who have died "in harness." Last year General Motors lost 29 men of executive rank, 16 of whom died of cardiovascular disorders. This is the group that is most expensive to train, for the wisdom of judgment that comes with experience is their most valuable asset.

The young executive group could well be compared with the pilot in an operating air force. It is estimated that training a pilot costs $50,000. This is a great investment, and consequently the Air Forces have a special medical program for "the care of the flyer." Their medical examinations come at frequent intervals, and are meticulously done from both a physical and psychological standpoint. The airlines follow the same pattern, and the results have been most dramatic. Pilots, planes, passengers and cargoes have been saved because pilots have been kept fit. There is a great need today for a similar program for the "care of the executive" if we are to preserve our most valuable assets in mobilization.

More than 300 corporations now offer their executives periodic health examinations. One of the first to do so was General Motors. In analyzing their 1946 experience, General Motors found that of 718 executives examined, 590 showed some pathology, of which 24% was related to diseases of the heart and circulation.

The Consolidated Edison Company of New York recently reported its experience with 307 executives in "INDUSTRIAL MEDICINE AND SURGERY" (May, 1950) in which Dr. S. Charles Franco says:

"The periodic health examination uncovered major medical conditions in 25% of the executives examined. These mainly involved the cardiovascular system. Obesity was another major finding, and 50% of these had associated cardiovascular involvement. Experience with health counseling shows that these conditions can be prevented in many cases, and greatly improved in others."

This is the same experience as that of the Standard Oil Company, whose Medical Director, Dr. Robert Page, has reported that out of 290 executives examined, 200 had medical problems, many of which were important, and materially affected working ability. Stressing the importance of frequent examinations, Dr. Page said, "It is only when disorders are found in very early stages that proper corrective procedures will give favorable results and the true principles of constructive medicine can be applied.

A unique program of health examinations has been operating at the Greenbrier Clinic in White Sulphur Springs, West Virginia, for two years. The clinic was organized in 1947 at the suggestion of Edward Stettinius, who felt that, if executives could go to a resort and have a leisurely examination outside the hospital and usual clinic atmosphere, more would be "enticed" to have a yearly check-up. It was not to be a routine medical examination, but a careful, positive health inventory that would explore the executive's habits, anxieties, if any, social and business problems, and anything else that might have a bearing on his health and efficiency.

The clinic was organized under the direction of Dr. James P. Baker, a medical teacher from Richmond, Virginia, with a staff of two excellent internists and a top medical advisory board representing a cross-section of American medicine. The first two years' experience has been most informative. One company has sent 89 executives for examination. In only 11 of these was no disease found; 24 were overweight, and 29 had some disease of the cardiovascular system.

It was interesting that in this group 17 showed evidence of secondary anemia. This finding might be compared with vitamin deficiencies noted in the upper level Chinese population who ate polished rice, while their less financially fortunate fellows, who ate cheaper rice, did not acquire beri-beri, since the necessary preventive vitamins were in the husk of the brown rice. Evidently, some successful executives today do not select their diet on the basis of modern nutritional knowledge, but rather on personal likes and dislikes.

Dr. Baker and his associates note than an occasional physical examination is not enough, but, just like that for the pilots, the real value of such a program comes from its being a regular procedure with a continuous health record, by which problems can be evaluated properly while they are still in the preventable stage.

Periodic health examinations have more to offer today than ever before, from the early detection standpoint. Drs. Ivy and Krasno's new "flicker photometry" test, for example, apparently can pick up early diseases of the circulatory system long before our routine methods have been able to detect them. This is of particular significance, as more than one-third of the deaths in the 35-55 age group are now cardiovascular, as compared with 25% 15 years ago. The research of Dr. John Gofman and his assistants on cholesterol metabolism by studying the molecular types after spinning the blood in a high-speed centrifuge, has given us another new tool for early detection of cardiovascular disease, and provides an indication for dietary restrictions in susceptible individuals.

Executives who are working under the tension of the times owe it not only to themselves but to their country to subject themselves to the medical disciplines as well as the industrial disciplines. If they are used, the tools are available to keep the executive in production and out of the obituary column.

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Valuable and Timely

THE article by FISHBEIN and SALTER, on page 444, offers a beginning in the matter of responses to the inquiry by DR. GODENNE, of Kambava, Katanga, Belgian Congo, in the August Journal (INDUSTRIAL MEDICINE AND SURGERY, 19:8, 392), regarding the hazards of heavy truck driving. We hope there will be other contributions on this subject. As the Editors said in their note following DR. GODENNE'S letter, "The better and wider experiences" of all who have knowledge that may be useful in a full discussion are "bespoken and awaited." This is mentioned in full recognition of the value and timeliness of the current study; its value is considerable, and its timeliness couldn't have been more propitiously arranged.

General Motors Presents

MAX BURNELL, M.D., Medical Director, in keynoting the 1950 General Motors Medical Conference, announced this year's theme: "Industrial Medicine Renders Greater Service Through Research and Selective Placement." Via this dichotomy of professional activity it was demonstrated before a group of more than 100 GMC physicians that original investigation in the industrial setting is both possible and productive, and that many techniques comprise the total effort in the procurement, testing, placement, and adjustment of employees.

This General Motors Medical Conference convenes annually, and this year on April 24 assembled at the Electro-Motive Division, LaGrange, Illinois. The scientific contributions there discussed feature this issue of the Journal.

The preventive medicine phases of industrial health activities are well demonstrated in the presentations of BAUGHN on antihistamines in the treatment of the common cold (p. 413), and WOLFF'S "Accident Proneness—a Serious Industrial Problem" (p. 419). Emergency treatment, a feature of all within-plant medical programs, was exemplified by the adaptation of a current therapeutic technique to the needs of industrial personnel. This was described in "Adaptation of Intravenous Procaine to Industrial Medicine," by SHELANSKI (p. 427).

No effort directed toward the well-being of the employee is the product or activity of a single person or discipline. Hence, in the panel discussion, "The Experience of General Motors in Developing New Techniques for Selection, Placement and Follow-up of Employees," representatives of medicine (DR. BURNELL), personnel services, employment practices, personnel evaluation services, and industrial relations, contributed their thinking toward employee integration.

Few outside physicians have had the opportunity of joining the General Motors group in their annual medical meeting. This year we were one of the favored few and reveled not only in the formal program itself, but in the manner in which DR. WILLIAM D. TILLSON, as General Chairman, arranged for the pleasure and comfort of those attending. Manufacturing a truly dramatic product (Diesel locomotives), the plant at La Grange presents good industrial planning, for, away from darkness and over-crowding, certain beautification of the area is possible. Dispatch in all the arrangements made for a prompt transport of the visiting physicians from hotel curbside to plant side. The assembly room, with its cut-away locomotive complete with all the sound and pulsation of actual operation, provided a stimulating cyclorama for the setting where industry and medicine came to meet. The mid-morning repast, the sumptuous smorgasbord that defied noontime appetites, and the bountiful banquet at the Medinah Country Club satisfied the visitor in all his alimentary demands. To carry one to loftier cultural planes were "The Haylofters," an unrepressed hill-billy musical group (all EMD employees) who added to the mid-day merriment, and the distaff violin-accordion-bass trio, who

minstreled from group to group during the detailed preparations for the banquet.

Replete in all respects from deckled-edge program to "p. r. n." analgesics and soporifics was the packet of historical, note-taking and therapeutic items offered each physician. Instructive was the tour of the plant by the safety-bespectacled visitors, where modest-sized man was dwarfed by the ever-enlarging, ever-growing locomotives on their way down the assembly line.

Highlighting the day's events was the recognition given by General Motors to Doctors, all of whom had seen more than 25 years of service with the Corporation, and pleased indeed were the recipients of the engraved wrist watches.

The decor of the meeting saw the presentation and discussion of prepared papers in customary style. Unusual, though, was the total effort to make the day attractive, comfortable, and enjoyable to the visitor, and, in the lush environs of a large successful manufacturing plant, this unorthodoxy in medical conclaves provided highly pleasurable learning.

We are grateful for the privilege of being G.M.—M.D. for a day.

How Well Do Hearing Aids Aid?

THERE may be handicapped persons but there should be no handicapped industrial workers. Any workman successfully adjusted to the performance of an occupational task is not a handicapped workman. This applies to the tens of thousands with impaired hearing. Manifestly there are tasks by the score for which those even partially deaf are unsuited. Examples are unnecessary. Other tasks in larger number place no burden on auditory acuity, but in their total lives hearing impairment introduces deprivations. In any situation large numbers turn to hearing aids to better their lot. No workman or any other victim of impaired hearing, apart from skilled guidance, is ever sure he has attained maximum benefits from hearing aids. He may be delighted that his hearing is 15% improved when readily the benefit might reach 35%. How is he to know his full opportunities? Neither in praise nor in condemnation of any particular hearing aid are these statements made, but some types may be better than others.

Medical departments in industry, directly or indirectly concerned in better hearing for workmen through auditory instruments, should be influenced by the knowledge that the American Standards Association under impeccable guidance has created a series of standards related to microphones and earphones in general. Ultimately these provisions assure extra values and safeguards for every hearing aid wearer. These advances are announced in highly technical terminology in *Standardization* (21:170, 1950) in an article entitled "How Well Does an Earphone Work?" by DR. LEO L. BERANEK, Technical Director of the Acoustics Laboratory of Massachusetts Institute of Technology. From 1940 to 1946 he was the director of the wartime Electro-Acoustic and Systems Research Laboratory at Harvard University. Praiseworthy as his work there undeniably is, his achievements, now more closely identified with less restricted fields, call for continuing acclaim.

Synergism in Occupational Exposures

TRADITIONS die slowly in any land and in any profession. In China it is almost impossible to sell a watch or clock. Tradition associates such instruments with death. Young as industrial hygiene is as a profession, it has established well-rooted traditions, sometimes in error, to which it adheres tenaciously. Daily hundreds of dust counts are conducted employing the old light-field microscopic method, yet it is well established that a thousandfold error arises as revealed by the electron microscope. Another tradition that lingers on is the belief that any harmful substance in the atmosphere acts solely through its own properties and in conjunction with no other substance that may co-exist and which in turn acts only through its own specific properties. Thus, if by chance in any certain workroom hydrogen sulfide, in a quantity below that regarded as significant, is present along with cyanide gas also below harmful levels, the assumption is that neither warrants concern and that their dual presence adds no new feature to the situation. Undoubtedly this is true for numerous substances. In the case of atmospheric pollution due to smog, in its outstanding occurrences, no one has been able to detect any level of any one substance conducive to the harm that manifestly has been brought about. At the same time, examining toxicologists may have reported the presence of eight or 10 agents in trace quantities well below accepted dangerous levels. It then becomes pertinent to inquire if the possibility does not arise that two or more, acting synergistically, fully may account for the evil consequences? A somewhat dissimilar possibility presents itself in the concept that some one of several atmospheric constituents may serve as a "trigger" that imparts to one or more other elements a celerity or quality of action not known when solely present. With admirable scientific conservatism the industrial hygienists, the toxicologists, and the pathologists proclaim that all

such matters require evidence and shout, "What is the evidence?"

Evidence is not wholly lacking, but only one new item is proffered. Forssman, Gerndandt, and Goldberg, in *Acta Physiologica Scandinavica* (16:256, 1948), describe the synergistic action of carbon monoxide and trichloethylene in experimental mice. They note: "If mice are exposed to carbon monoxide and trichloethylene simultaneously, a potentiation of the effect of the two substances is obtained, on the condition that the carbon monoxide is allowed to act for some time on the organism." Long after all carbon monoxide had been exhaled, the increased responsiveness to trichloethylene persisted. The quality and extent of this work provide conviction that the co-presence of these two toxic agents induced changes beyond those expectable in the absence of one or the other. This is synergism.

Sacred as traditions may be, the scientific ones lose their sanctity unless they withstand scientific exploration. Nothing scientific is inviolate.

Executives and Their Coronaries

THE accuracy of our "vital statistics" as to the incidence of malignant and cardiovascular renal diseases, to say nothing of the actual causes of death, is open to much question. It would be interesting to compare figures based only on autopsy findings, with those compiled from all death certificates. Sudden death, in the absence of some definite evidence to the contrary, is usually attributed to "heart disease," yet the heart may be in excellent functioning condition when some other part of the body is at fault.

Cardiovascular renal diseases have steadily increased in frequency in mortality statistics over the last 50 years. Infectious diseases are gradually disappearing, the population is living longer, and cardiovascular troubles, together with cancer, are becoming increasingly important.

The sudden deaths of prominent men have made the public aware of the frequency of cardiac fatalities among men in their most productive years. Cardiovascular disease accounts for about 36% of all deaths in the 35 to 55 age group, and about 52% in the 55 to 75 age group. There is a popular impression that this increase reflects high-tension working and living, together with excesses in the use of tobacco and alcohol. These may be factors, although heredity is probably more important.

Twenty-five years ago at Cook County Hospital in Chicago, coronary thrombosis in Negroes was an unusual finding at autopsy as the cause of death. Today, it is common even in young Negroes. Is this one result of the changes and demands imposed upon the life of the Northern colored male? It would be interesting to have statistics on the relative frequency of coronary thrombosis in the male colored population of New Orleans and Birmingham as compared with Chicago and Detroit.

The American Heart Association, the Life Extension Examiners of New York, and many other organizations are searching for the causes and methods of prevention of conditions reflected in the constantly rising cardiac death rates. Congenital heart diseases now respond to surgical treatment in an increasing percentage of cases. Endocarditic, syphilitic and rheumatic heart diseases will steadily decrease in frequency with our newer methods of prevention and treatment; but hypertension and arteriosclerosis, which comprise about 70% of all cardiovascular disorders, may be expected to continue taking their toll . . . .

Physicians in industry have a particular responsibility regarding the health of executives. Annual examinations and frequent consultations should be available for all employees who care to avail themselves of the proffered medical services. The executives, however, should be made to feel that they *must* comply with the doctor's orders. If the most valuable machines in the plant deserve, and get, the best of care why is it not economically sound to devote special attention to the most valuable of the personnel? The powerfully-muscled, angular, dynamic, driving executive is the hard-working, hard-playing type most susceptible to coronary thrombosis. The tall lean individuals and the short fat ones are less apt to be stricken, although overweight is of great importance. But an annual physical examination is not enough for either. If the lives of our most valuable men are to be prolonged, each requires individual study and counsel, and management must revise its thinking on how hard an executive should be required to work or allowed to work if the physician detects evidence of cardiovascular trouble.

Industry is waking up to this problem, and a beginning may be said to be under way. DR. HOWARD A. RUSK, in the *New York Times* of July 30, 1950, tells what some companies are doing (see page 449 herein). But an article in the June, 1950, issue of *Fortune* presents the subject in a manner that should arrest the attention of the medical officers of all companies. Much more needs to be done—and quickly.

—CHESTER C. GUY, M.D.

Reduce absenteeism and increase efficiency through COLD CONTROL

The effect of cold control on production costs will be readily apparent to all in management, and particularly to physicians charged with maintaining the physical fitness of plant or office personnel.

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HOW ANAHIST SHOULD BE ADMINISTERED. Employees should be instructed to report for treatment upon exposure, or at the first sign of a cold. One ANAHIST tablet is taken immediately . . . then 1 after each meal and at bedtime. The drug is continued for seventy-two hours.

Special industrial-size bottles of 1,000 tablets (25 mg. each tablet) are available for dispensing purposes. Write for quantity prices and literature.

*ANAHIST is the trademark of the Anahist Co., Inc. for its brand of Thonzylamine Hydrochloride.

1. Arminio, J. J., and Sweet, C. C.: Indust. Med. 18: 509 (1949). 2. Tebrock, H. E.: Indust. Med. 19: 39 (1950).

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—From *Factory Man. & Mtce.*, in Connecticut General's *Notes & Quotes*, August, 1950.

When Do We Eat?

A WORKMAN produces a lot at the start of each shift, then tapers off a little before lunch. With a meal under his belt, he's more productive but starts tapering off again at mid-afternoon. Industry has long recognized this as a normal fatigue pattern that couldn't be remedied. Now, though, a new and somewhat startling proposal to meet the problem is making the rounds in industry: Cut out leisurely, hour-long lunch periods, and give the lost time back to employees in mid-morning and mid-afternoon "lunch-snack" periods. The suggestion stems from recent experiments conducted at Yale. These indicated that the human organism doesn't work at its best under the traditional three-meals-a-day system. It does better if it gets about the same amount of food in four meals. Translated into plant terms, the Yale physiologists feel employees lose a minimum of work efficiency under a lunch-and-snack plan. It gives workers a "lift" just when they're beginning to tire. Result: steadier productivity without proportionately higher effort.

—From *Business Week*, February 11, 1950, in *The Management Review*, July, 1950.

Who Knows—And What

SELECTED readers have received, or shortly will receive, from The A. N. Marquis Company requests for information pertaining to their personal specialties within their occupational fields. Information submitted will be reviewed to determine suitability for inclusion in the company's new and unique reference work, *Who Knows—And What*, the Second Edition of which has been put into immediate compilation following the widespread acceptance of the First Edition, published earlier this year. The unique reference value of *Who Knows* stems, according to the publishers, from two major features: (1) the inclusion of only those persons having special skills or knowledge in one or more of thousands of highly-specific topics judged by the editors to be subject to general reference interest, together with information on research and experience in these fields; general public or professional eminence is not a deciding factor in selections. (2) the

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Locator Index, which refers the user by means of a simple key to the listing of any person in the book having special knowledge about any one of the subjects included in the Index. The company, which also publishes *Who's Who in America*, will welcome suggestions. Communicate directly with the company at 210 E. Ohio St., Chicago 11, Illinois.

Silicosis Source

SILICOSIS as an occupational disease among locomotive operators in mines has been attributed to the traction material in common use. This traction material, which in many cases is ordinary sand, is systematically distributed on the rails in order to afford sufficient traction for the locomotive. The spinning and grinding action of the wheels necessarily produces dust which, in the confined space of entries or tunnels, may rise to high atmospheric concentrations. In the case of sand, the free silica content of the atmospheric dust may be far in excess of the maximum amount permissible in dusty trades.

—From *Public Health Reports*, August 11, 1950.

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is used by
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industrial plants in the U. S. A.

Horse sense about ATHLETE'S FOOT

91 skin specialists condemn old-fashioned foot baths as being "illogical and potentially harmful to the skin."
(Archives of Dermatology and Syphilology for April, 1942.)

The best way to prevent Athlete's Foot, say these specialists, is to *stop* trying to disinfect the feet. Concentrate instead on improving the condition of the skin.

✓ *A sound skin is nature's best protection against fungus attack*

That is good horse sense. And it's the basic principle of the Onox skin-toughening method of Athlete's Foot prevention. Instead of disinfecting the feet, Onox mineral salts toughen the shoe-softened skin *and restore its natural resistance to fungus growth.* No fungus growth—no Athlete's Foot.

The above statements are substantiated in tests made by Pease Laboratories, Inc. of New York, and the Department of Bacteriology of a large University. A summary of these tests is available on request.

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Free Ride to Utopia?

PEOPLE *are* funny! Put a "free" tag on a house complete with car and the universal reaction will be: "What's the catch?" But far too many persons fall hard for promises of a free ride to health, wealth, and happiness. The price tag on the Welfare State may read "free"; actually, the cost comes high, as the British people found out when Sir Stafford Cripps presented his new budget to the House of Commons. The Chancellor of the Exchequer included in this budget almost a billion dollars for socialized medicine—plus a proposal for doubling the tax on gasoline and putting a $33^1/_3\%$ purchase tax on commercial vehicles. Truckers immediately began talking about an extra delivery charge on bills for groceries, meat, bread, and like necessities. So, the bill for "payless" visits to doctor and dentist would be added to the cost of eating. We, at Chilton, believe the time has come to stop the proponents of the Welfare State from putting fraudulent price tags on their promises. We believe that now is the time to demonstrate to the American public that the real road to a better standard of living for all is the encouragement of free enterprise through economy in government and a realistic approach to taxation.

—Advertisement of the Chilton Company (Inc.) in *Advertising Age*, July 3, 1950.

"Inbetweeners"

COMPANIES with 50 to 500 employees tend to have the highest accident

RIB-BACKS make it Easy...
Easy ON THE SURGEON:
Superior cutting efficiency, predicated upon inimitable, uniform sharpness throughout the entire cutting edge, Rib-reinforcement—an exclusive feature that provides added strength and a degree of rigidity best calculated to resist lateral pressure, insures dependable blade performance which serves the surgeon to the greatest advantage.
Easy ON THE ASSISTANTS:
Dependable blade performance poses fewer problems for other members of the surgical team. Less time-consuming delays . . . less confusion . . . an essential contribution towards clocklike surgical procedure.
Easy TO HANDLE:
Precision fabricating methods and rigid inspection controls insure blade-for-blade uniformity with a resultant capacity to accurately and firmly fit every B-P Handle designed for component use. Various blade patterns can be interchanged instantly as required.
Easy ON THE BUDGET:
The buyer is assured of 12 perfect blades in every dozen RIB-BACKS purchased. Their superior qualities and longer periods of satisfactory utilization are also factors that reduce blade consumption to an economic minimum.
It's Sharp
Ask your dealer
BARD-PARKER COMPANY, INC.
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B-P
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rates. That's reflected by investigations growing out of the President's Conference on Industrial Safety. Here's why: In the very small plant the owner is in close contact with operations, knows the serious effects even one accident can have on his business, and gives hazards prompt attention. Larger plants (more than 500 workers) can support a full-time safety engineer, join safety organizations, utilize the safety facilities of their insurance carriers. In the "inbetweeners," the top man loses contact with line operations, can't afford a safety specialist, delegates safety responsibility to unequipped and busy foremen.

—From *Labor Checklist* (Research Institute of America, Inc.) May 31, 1950, in *The Management Review*, July, 1950.

Government Workers

THE White House has indicated that it wants to expand the present limited U.S. employee health plans in more cities and governmental centers. Increased benefits will be considered later. This development is significant because nearly 2,000,000 persons work for the Federal government in non-military jobs.

—*Wisconsin Med. J.*, July, 1950.

Chest Disease Courses

THE COUNCIL on Postgraduate Medical Education of the American College of Chest Physicians announces that it will sponsor two Postgraduate courses in Recent Advances in Diseases of the Chest. The first course will be held at the St. Clair Hotel, Chicago, Illinois, October 16-20, 1950. The second course will be held at the Hotel New Yorker, New York City, November 13-18, 1950. Tuition for each course is $50.00. Applications will be accepted in the order in which they are received as registration will be limited. Address all inquiries and applications to the Council on Post-graduate Medical Education, 500 North Dearborn Street, Chicago 10, Illinois.

Test for Stomach Cancer

AN INGENIOUS balloon test for cancer of the stomach has been devised by a group of doctors from Cornell University Medical College and New York Hospital, New York. The process is reported in the August 12 *Journal of the American Medical Association* by Drs. Frederick G. Panico, George N. Papanicolaou and William A. Cooper. A rubber balloon covered with short pieces of braided silk and attached to the end of a tube is swallowed into the patient's stomach and then inflated. Cells from the stomach lining cling to this balloon "brush." The apparatus is deflated and withdrawn and the cells are removed by washing in a special solution. The cells are then examined by means of the smear test, developed by Dr. Papanicolaou and in wide use for detecting cancer of the cervix in women. Describing the test, Dr. Papanicolaou says: "Cells at the surface of the growth tend to be dislodged. A technique for collecting the cellular debris, smearing it upon glass slides, and staining it has been perfected so that the various components may be studied. Interpretation of the

smear requires the services of a careful and discriminating cytologist who has had experience in this field." The balloon test was used in collecting cellular material from the stomachs of 33 patients in whom the diagnosis of a disease was confirmed by surgery, the doctors report. Of this group of 33, 17 had malignant disease and 16 had diseases other than cancer. Among the 17 patients with cancer, balloon wash smears revealed no malignant cells in two cases, suspicious cells in one case and malignant cells in 14 cases. Among the 16 patients with conditions other than cancer, smears were negative for malignant cells in 14. Two specimens were read falsely as suggestive of malignancy.

—A.M.A. News Release.

Cancer

INDUSTRY has not been oblivious to the cancer threat. Indeed, many large companies have broad programs directed toward cancer control. Periodic cancer examinations of all employees are conducted by Phillips Petroleum Company and the Union Carbide and Carbon Corporation. The Standard Oil Company sponsors studies at Memorial Hospital, New York, on carcinogenic components of refined petroleum products, and many pharmaceutical houses underwrite research dealing with the biological action and possible carcinogenic properties of drugs. The Socony-Vacuum Oil Company's program is an excellent example of the fight industry is putting up against cancer. In their house organ, which has company-wide distribution, articles appear on the cancer dangers involved in the petroleum industry and tell the worker how he can protect himself. These articles are not of a punch-pulling form; they approach the subject squarely, without holding back any facts, even though some companies fear these facts will give the industry a black eye. This organization also supervises employees' hygiene and takes periodic surveys through all its refineries and installations.

—From *The Cancer Bulletin* (Texas Edition), quoted in *Industrial Health*, June, July, 1950.

First Aid Legislation

LEGISLATION providing for administration of first aid and/or other medical services in places of employment was enacted during the recent session of the Rhode Island General Assembly. It will become effective July 1, 1951. The new law requires that any person, firm or corporation, employing from 25 to 399 persons in any factory, shop, mechanical or mercantile establishment shall provide for administration of first aid by either a practical nurse, or a registered nurse. Any person, firm or corporation, employing 400 or more persons in any factory, shop, mechanical, or mercantile establishment, shall furnish an accident room or similar accommodation. This accident room, its facilities and services shall be under the direction of a registered nurse. Important inclusions in the law are definitions of

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1. Behrman, H. T., Combes, F. C., Bobroff, A., and Leviticus, R.: Industrial Med. & Surg. 18:512, 1949.
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"registered nurse," "practical nurse," "first aid worker," "first aid," and "standing orders."
—*Industrial Hygiene Newsletter*, August, 1950.

"The Hard Way"

FORTUNATELY most experienced physicians in industry are aware of the potential contributions which psychology and psychiatry can make, not only on the practical level of treating individuals in need of counseling, but on the preventive and policy-making levels as well. Specialists, working in collaboration with them, must teach and provide clinical training, both formally and by practical demonstration in specific instances, which will convincingly portray the value of a psychotherapeutic approach to industrial interpersonal relations. Painstaking efforts are required to overcome the resistance of certain men in top positions who are unaware that they create more problems than they solve by using coercive tactics which violate the principles of mental health. Some who have "come up the hard way" and whose training was exclusively in the fields of engineering, accounting, or law, are peculiarly impervious to a new, non-authoritarian approach to human relations.

—From "The Place of Psychiatry in Industry" by L. E. HIMLER, M.D., in *The Journal of the Michigan State Medical Society*, January, 1950.

Wind in the Willows

A PERIPATETIC correspondent of the London *Lancet*, in a recent Running Commentary comments on the "small psychological point . . . . which is the basis of a big proportion of road accidents." The small psychological point that may loom so large upon the road is the sense of power behind the wheel. It is the zest for aggression with which the world has become so unpleasantly familiar. It is the effect that comes from the possession of a gun, a uniform or political office by one with an unstable personality. It is the epitome of a sense of power that comes to its possessor as it were by accident—from without, and momentarily hiding the true weakness that lies within. It is the insulation that the inferior person by vicarious means thus seems to acquire against personal contact, and apparently against the necessity of personal responsibility, and against immediate retribution. "Insulation, power and a platform" the circumambulatory correspondent of the *Lancet* finds "in a car or in becoming a na-

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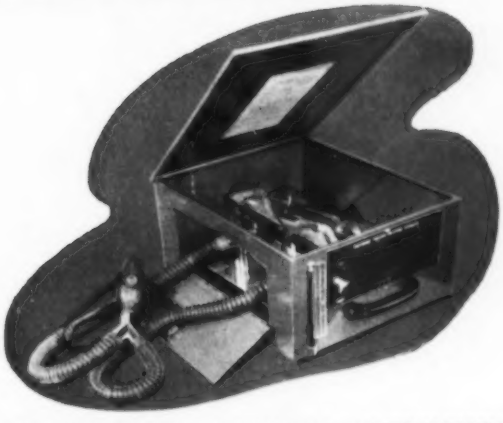

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1. *Pressure-Breathing with oxygen and Helium-oxygen in Pulmonary Edema and Obstructive Dyspnea, Hylan A. Bickerman, M.D., Bulletin of the New York Academy of Medicine, June 1950, Vol. 26, No. 6.*

2. *Physiological Therapy in Respiratory Diseases, Alvan L. Barach, M.D., Chapter 7, pages 120-121, 131, 156; Chapter 8, pages 162-164; Chapter 25, pages 359-361.*

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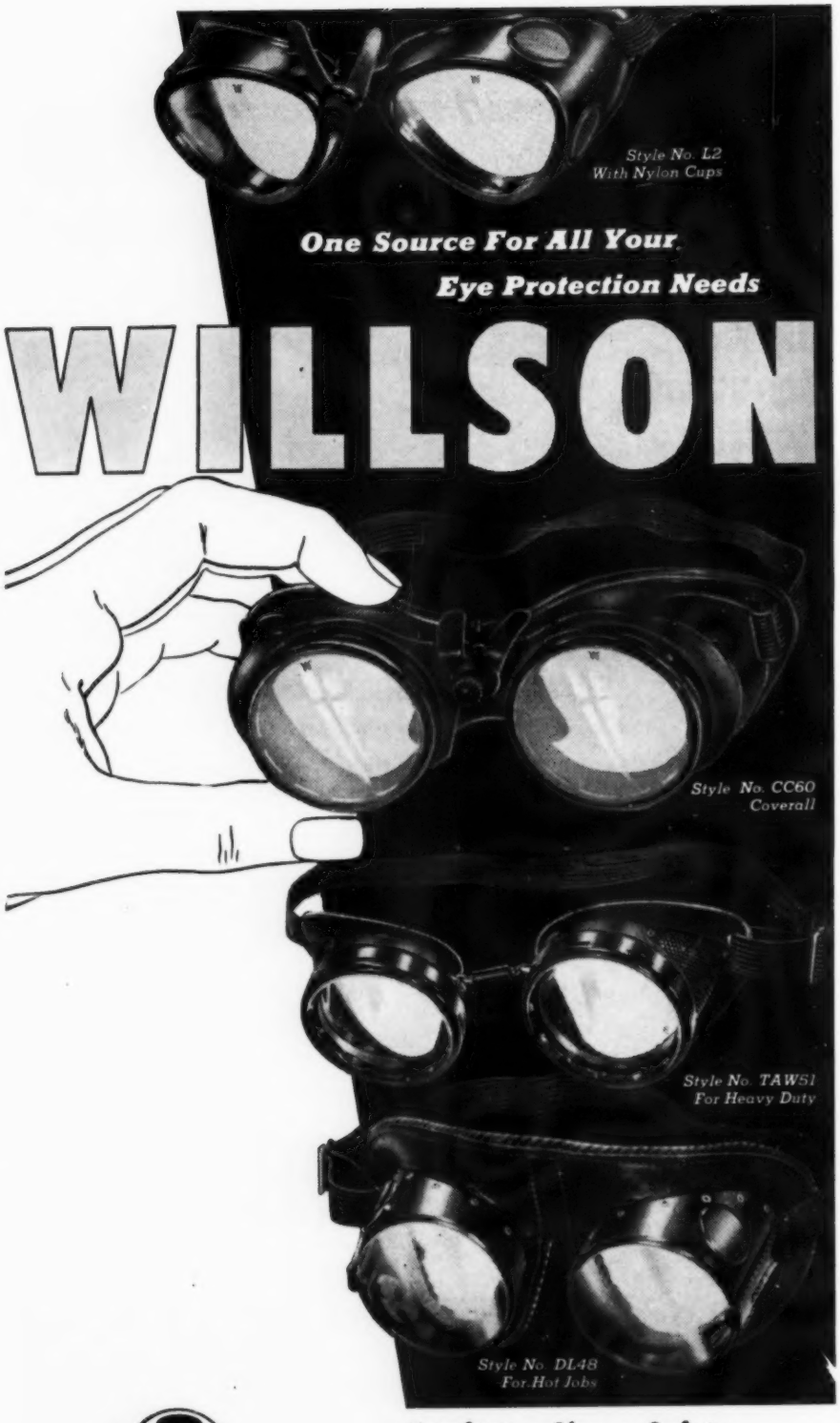

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tional leader." Those who are familiar with *The Wind in the Willows* will find in Mr. Toad of Toad Hall, the bully of the highway of 1910, the exact counterpart of a million motorists of 1950, and the motivating force behind many another type of aggressor.

—Editorial in *New England J. Med.*, August 3, 1950.

Not Hopeless

DEFENSE against the atomic bomb is not hopeless. It is only more complicated than defense against the old-fashioned TNT and fire bombs. You must act more quickly. But if you know what to expect, what to do, you may come through unharmed even while your neighbors die. If, that is, you think fast in that split second when your life is at stake. When an atomic bomb strikes there will be disaster, destruction, death. You need not die. Think — plan — now, and increase your chance of survival. It is possible to protect at least one room in your home against the effects of the bomb. It is possible to guard against lethal radiation." The foregoing is from the Introduction in "Atomic Attack—A Manual for Survival," just released. This book is a practical manual for Civil Defense organizations, and others connected with disaster committees. It is also a "What To Do Book" for the individual. The authors are John L. Balderston, Jr., and Gordon W. Hewes. Balderston was Physicist-Engineer at Oak Ridge, Tenn., 1943-47; Assistant-Director, Association of Scientists for Atomic Education, 1947-48, and is presently, Radioisotope Research Consultant, Los Angeles. Hewes was Analyzer of Japanese target cities for the

20th Air Force, World War II, and is presently with the University of Southern California. This Manual for Survival is sponsored by the Council on Atomic Implications, at the University of Southern California. It contains 64 pages with illustrations, and sells for one dollar a copy.

Heart Attacks

THERE appears to be a growing trend toward the awarding of workmen's compensation benefits to employed persons who suffer 'heart attacks.' In New York State for the first six months of 1948, compensation benefits paid for heart disease amounted to approximately half a million dollars. The relationship of effort and trauma to heart disease is not well understood. In many cases in which claims have been paid it is rather difficult for a neutral observer to see the basis for the finding, by a referee, of causal relationship. While compensation laws usually imply that reasonable doubt should be resolved in favor of the claimant, and while one's sympathy may be with the unfortunate victim of heart disease, the fact remains that every case in which benefits are awarded constitutes a new obstacle to the securing of employment for cardiacs."

—From an article by LEONARD J. GOLDWATER, M.D., and MARTHA ASHCRAFT in *J. Rehab.*, December, 1949, quoted in *Industrial Hygiene Newsletter*, August, 1950.

Destiny

IS THERE a pattern in what we do and what happens to us? It is a question that has long intrigued both the scientist and the quack. Right now it looks as if the scientist is approaching an answer, and will be able to show us that the world and its events do follow a pattern of rhythm, or a cycle. Some 3,000 studies have been made in about 36 different fields, ranging from agronomy to zoology, by way of herpetology, human emotions and poetry. There is evidence that once the cycle of the growth of a yeast cell, or the birth rate of the beaver, or various financial activities have been charted, future activity can be anticipated to a surprising degree. The study of cycles or rhythms is a coldly scientific pursuit, which deals strictly with verifiable concrete facts, and has no truck with such matters as which horse will win the fifth at Santa Anita. There is, for example, what cyclists call the mouse crash: the sharp decline in mouse population every four years. In the United States the mouse population reaches its lowest point every Presidential election year. Professor Rex B. Hersey of the University of Pennsylvania found that there is a definite rhythm to the human emotional state. His study revealed that each individual's pattern differs, and that while an individual's chart might occasionally fluctuate, it was never a difference of more than a week, regardless of outside influence. When, for instance, a man's pattern was upgrade he was increasingly optimistic—an argument with his wife or catching the devil from his boss, for in-

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stance, in no way lessened his feeling of all-is-right-with-the-world. While that feeling might last for six weeks rather than, say, the established five, there was no evidence that anything could alter the course of the cycle when it was due to change. In the other direction, just at the time his cycle was due to go downward he might get a long-desired promotion or a substantial raise, or his home life might be particularly cheerful—but for that period of the cycle he would nevertheless be progressively pessimistic. Subjects of the study admitted that they had no cause for worry, that they were conscious of the fact that everything was going as they wanted it to—yet were unable to shake off the feeling of depression. An incidental study brought to light a surprising fact. The subjects were not most efficient at their jobs when the pattern was rising. At the peak of the cycle, riding an emotional high tide, an ebullience of good spirits often led to a lot of visiting with associates, and an inclination to interrupt work for casual conversation. At that time it was most difficult to buckle down and concentrate. But when the pattern was descending, they were likely to avoid associates. During this period, their feeling of pessimism made them anti-social and easily irritated; as a result, they stuck closer to the job, concentrated more, and accomplished more work. In the early days of the last century the Hudson's Bay Company began to wonder about the variation in the number of pelts brought in by trappers each season. In an especially good year, the company might receive as many as 70,000 pelts, and it

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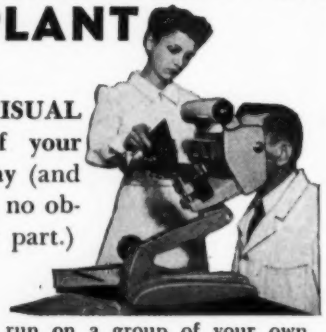

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would need a large quantity of merchandise to pay the trappers. But it was unnecessarily expensive to keep the same quantity of merchandise on the shelves in years when the take might be only 4,000 skins. Some unsung bookkeeper thought to chart these fluctuations, which revealed a rhythm of 9¾ years from peak to peak and valley to valley. There were variations of course, and like most cycles the variations also had a rhythm. In this case, it was seen that every second peak was slightly higher than the preceding one. The chart is credited with an important contribution to the company's success, and it has had an influence on the modern scientific study of cycles as one of the first carefully charted studies on this continent. Building activity, the thickness of sedimentary rock strata, droughts, some sunspot patterns and financial recessions follow a rhythm of 18 1/3 years. Is there any relation between any of them? Or might there be some significance in the fact that the death rate from heart disease in London and Paris for a given period was identical with the pattern of the ozone content in those two cities for the same period? In any discussion of cycles, one question is certain to present itself. If, for instance, you can chart stock market activity, why can't you go into the market and make a quick million? The answer is that you can't make it quickly, and whether you can make a million depends upon how much money you have to work with. According to a study by Edward R. Dewey, director of the Foundation for the Study of Cycles, if you followed the pattern and had sufficient financing to ride over the variations, or irregularities, you would average a profit of about 15% to 20% annually. Building in the United States has followed a rhythm of 18-1/3 years regardless of conditions that might be expected to influence it. We are now on the down-grade of the building pattern, which it is said, will reach its ebb in 1952, and there are students of cycles who will wager that no matter how urgent the need for housing and other building, that descent will continue until 1952. This doesn't imply that we are helpless, that we can do no more than wring our hands when a pattern affects us adversely. It does mean that so far we haven't tried to do very much to understand or make use of cycles. Where the attempt has been made, it has worked well. Some utilities companies, for instance, effect economies by planning their installations and operations according to the population cycles. Health authorities have been able to turn to advantage the knowledge that influenza and pneumonia have a three year cycle, or that for the past 20 years a plague has hit Bombay at intervals of a year and four days. It was William Shakespeare who remarked that "there is a tide in the affairs of men." The cyclists hope eventually to be able to prove that the dramatist spoke with as much scientific insight as poetic fancy.

—"Does Destiny Follow a Pattern," by WILFRED WEISS, in *Ethyl News*, June-July, 1949, condensed in *Blue Print for Health*, Summer, 1950.

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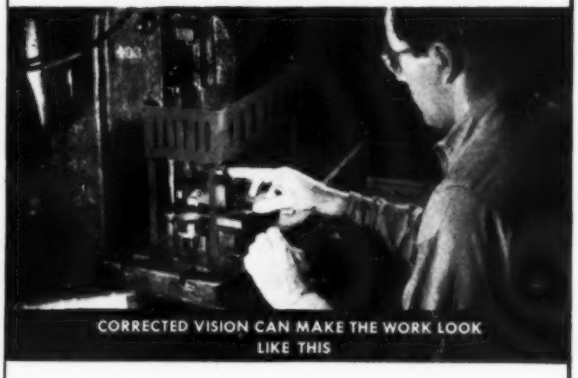

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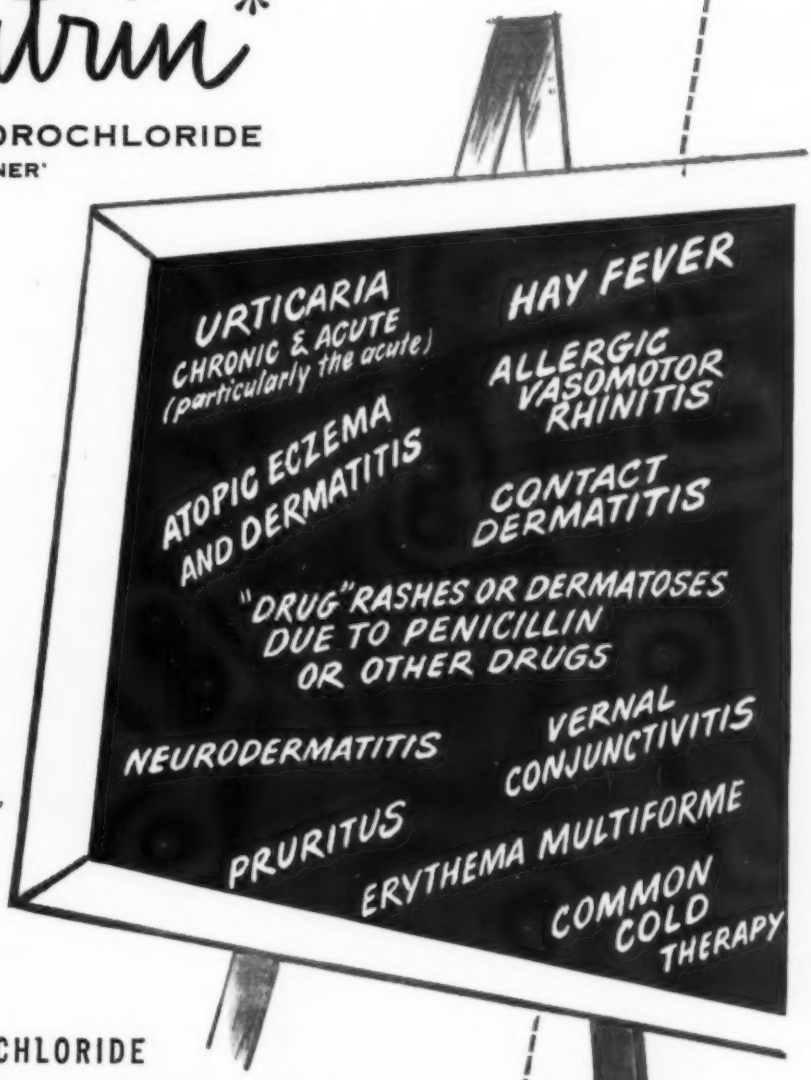

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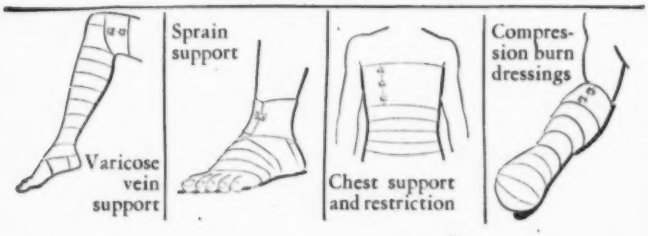

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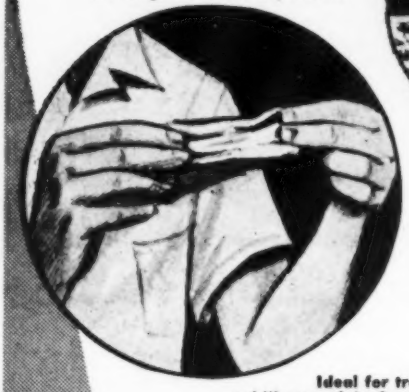

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*Schwartz, L., et al; Industrial Medicine, 18:6, 257-258, June, 1949.

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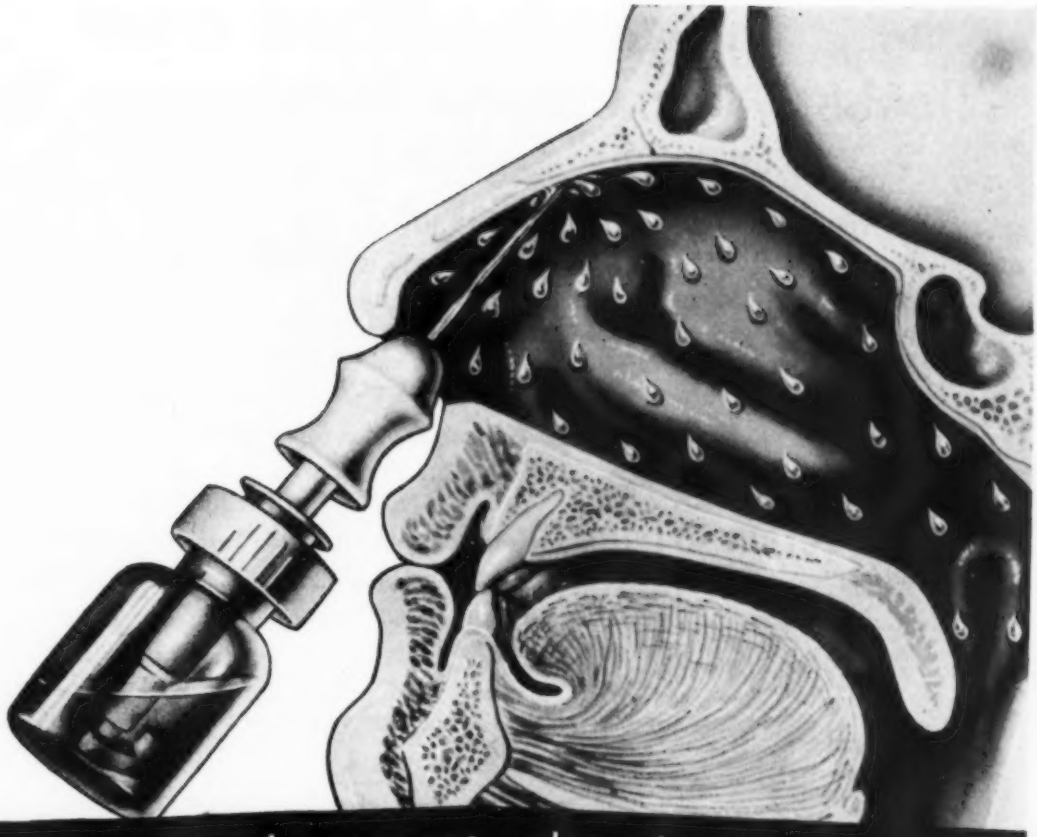

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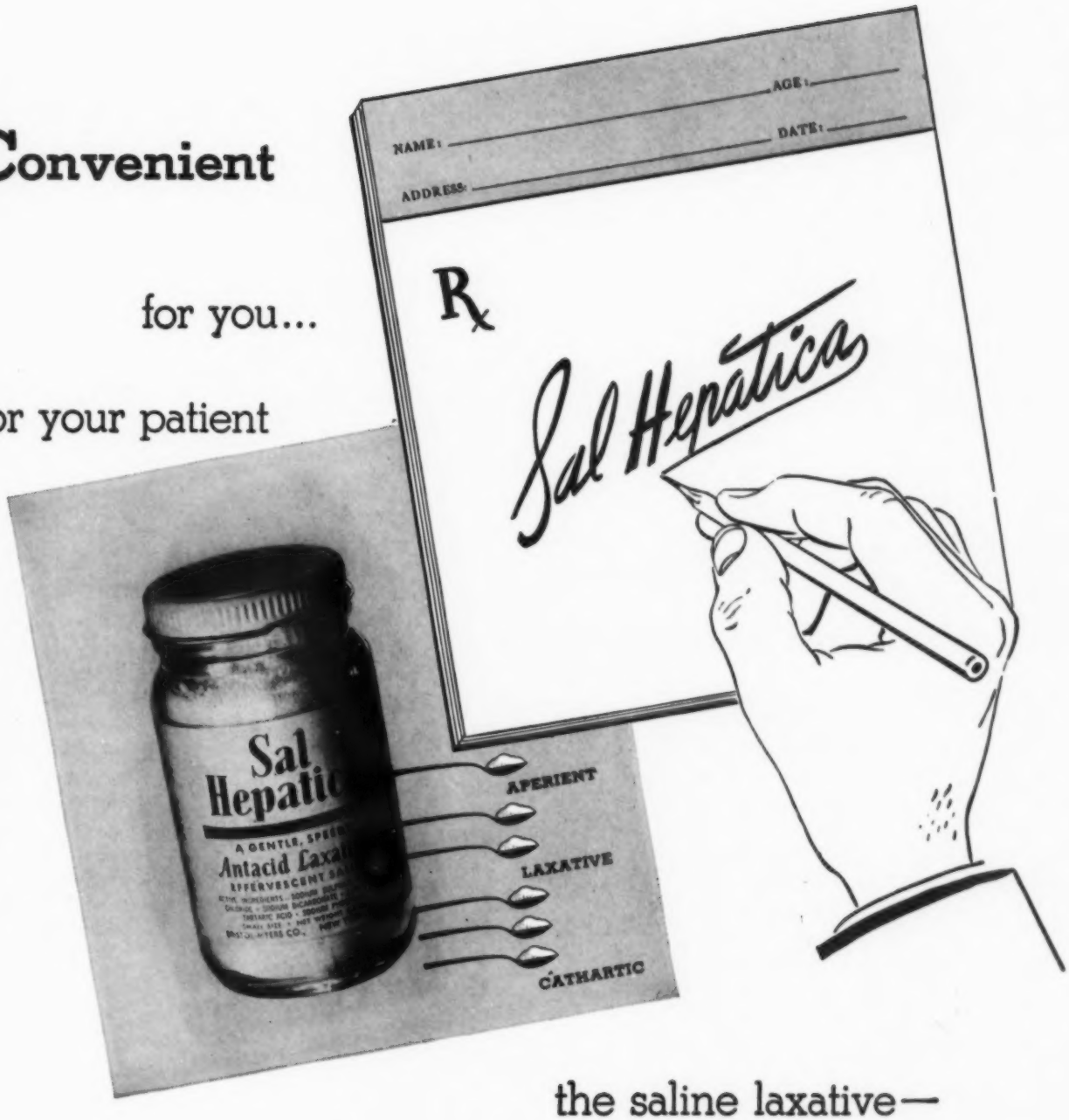

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